DOCUMENT RESUME

ED 427 183 CE 078 062

TITLE	Global 2000 National Workplace Literacy Program. Final Report.
INSTITUTION	Continuing Education Inst., Needham, MA.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC. National Workplace Literacy Program.
PUB DATE	1998-11-01
NOTE	318p.
PUB TYPE	Reports - Evaluative (142)
EDRS PRICE	MF01/PC13 Plus Postage.
DESCRIPTORS	Adult Basic Education; Case Studies; Education Work Relationship; High School Equivalency Programs; *Literacy Education; *Manufacturing Industry; Outcomes of Education; *Partnerships in Education; Program Effectiveness; *Regional Programs; School Business Relationship; Vocational English (Second Language); *Workplace Literacy
IDENTIFIERS	*Massachusetts

ABSTRACT

This document is the final report on Global 2000, a 3-year workplace literacy project during which 87% of the 805 employees of 10 Massachusetts manufacturing companies enrolled in workplace literacy classes offered by the Continuing Education Institute (CEI). A total of 61 classes were held and 41 employee-participants earned high school diplomas through CEI's adult diploma program. "Project Overview: What Does 'Good' Look Like?" (Lloyd David), constitutes the first 25% of the document. Discussed in the overview are the following: CEI's involvement in workplace education; lessons learned: The Global 2000 Model National Workplace Literacy Project; project management; demand for workplace education; the project's goals, classes, curriculum development, adult diploma program; the formative, summative, and external evaluations of the project; and dissemination activities. Appended to the overview are the following: list of Global 2000 project representatives; program statistics; and selected media coverage. The next section of the document consists of case studies of the 10 project sites, written by Katherine Archer. Concluding the document are two project evaluations: "Program Evaluation for Continuing Education Institute's Global 2000 Program at Fire Control Instruments, Power General/Nidec, Analog Devices, and Boston Scientific Corporation" (Debra Tuler) and "Global 2000 Project Evaluation: Summary of Findings" (Ron Maribett, Marilyn Kobus). (MN)

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ED 427 183

GLOBAL 2000

NATIONAL WORKPLACE LITERACY PROGRAM

FINAL REPORT

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CONTINUING
EDUCATION
INSTITUTE INC.

I. Project Overview: *What does "good" look like?*
Lloyd David, Ed.D, President/Executive Director, CEI

II. Ten Case Studies: *Global 2000 participating companies*
Katherine Archer, Global 2000 Coordinator

III. Project Evaluations

November 1, 1998

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INTRODUCTION

Global 2000 was one of 45 projects funded by the U.S. Department of Education under the National Workplace Literacy Program. The three-year project initially involved five Massachusetts manufacturing companies and an educational provider, the Continuing Education Institute (CEI). Five more manufacturers were later added to the partnership. A total of 61 classes were held, enrolling 805 employee-participants, of whom 87% completed their courses. A total of 41employee-participants earned high school diplomas through the CEI Adult Diploma Program.

Six of the ten participating companies have paid for the continuation of educational programs after the end of the funded project. *297 individual employees* have enrolled in these post-*Global 2000* company-sponsored classes as of June 30, 1998 -- 248 in ESL and 49 in the CEI Adult Diploma Program.

The first part of this report is a description of the *Global 2000* project written by Lloyd David, Ed.D., the CEI President/Executive Director, who describes the evolution of workplace education from the 1970's to the innovative management design and courses offered by the *Global 2000* project. The second part of the report, written by Katherine Archer, Coordinator of the *Global 2000* Project, is comprised of ten case studies describing how the model was implemented in each company. The third section includes a formative evaluation by Deborah Tuler and a summative evaluation by the outside evaluators Ron Maribett and Marilyn Kobus.

The CEI staff would like to thank the following people for their assistance in making the *Global 2000* project a success: the company representatives who served on the Executive Board and/or acted as liaisons for the project (see names attached to Part I); all the people who served on the Employee Involvement Teams; Allison Hill from the U.S. Department of Education; and finally the CEI instructors who were so inspiring to their students.

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I. Project Overview:
What does "good" look like?

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I. Project Overview: *What does "good" look like?*

LLOYD DAVID, ED.D,
PRESIDENT/EXECUTIVE DIRECTOR, CEI

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SUMMARY

Workplace education programs need strong management support in order to survive, yet experience shows that this support is not always forthcoming. In fact, it is often the case that there is just one key manager within a company who acts as the pivotal advocate for education, a precarious situation at best. With the Global 2000 project, the Continuing Education Institute (CEI) and its corporate partners found innovative ways to overcome this problem. What follows is a report on how it was done.

A TRUE STORY

Several years ago, CEI was asked to develop a workplace education program for a manufacturing company whose production workers were mainly immigrants from Southeast Asia and Latin America. Many had been working at the company for several years but had never learned to speak English.

This company, a small tool and die casting business in Massachusetts, employed approximately 350 employees, of which 280 were non-exempt. The company administered a math test as a prelude to tool and die cast technical training and found that one-third of its production workers were "functionally illiterate" with minimal English language comprehension and poor reading, writing and math skills. Functional illiteracy presented a major barrier to the employees' safety on-the-job, their ability to perform a diverse range of tasks, their job advancement opportunities, and the company's ability to remain a competitive player in the global marketplace.

Most employees worked as machine operators and received instructions in the form of "show and tell" or simple visual aids. More than half the employees were limited English proficient (10% Portuguese, 23% Hispanic, 23% Southeast Asian). They needed constant reinforcement and

supervision. They often made mistakes which cost the company time, materials and customers, thereby reducing profits. For example, in one case the company shipped 2000 parts instead of the 2550 ordered. After a great deal of time investigating the problem, it was determined that one of the workers had added wrong. Since the machinery and dies used to make this part had been disassembled, the company had to rebuild everything -- further compounding the problem and increasing the costs. Worst of all was a very unhappy and dissatisfied customer.

When the majority of the machine operators were initially hired, they were expected to perform simple operations processing metal parts. However, as the company moved toward world class manufacturing, the same processes required increasingly complex operations. Since the company wanted to gain ISO9000 certification, long-term limited English proficient employees needed to increase their basic skills. In addition, almost all the employees needed better literacy skills in order to respond to changing job requirements and to advance in their jobs. The company wanted to set higher standards in its hiring of entry-level workers, thus making the need to raise the skill levels of its longer-term employees even more critical. Given labor market conditions, indications were that future hires would also likely be immigrant workers deficient in basic skills.

Machine operators specifically needed to be able to read and comprehend shop orders, to write documentation of those orders, to perform basic calculations, to communicate in English with co-workers and supervisors, and above all to respond correctly to verbal instructions. The

company linked production mistakes and accidents to miscommunication, miscalculation and non-comprehension. The plant manager was very concerned with safety, since the year before an employee had suffered the loss of a finger in a machine due to an inability to understand and read the warning in English.

The company sought to reduce manufacturing costs in order to offer its customers more competitive prices. The company indicated that its competitive viability depended upon raising the basic skill levels of its employees -- or moving its operations to an area where there was a larger pool of skilled workers. The effects of a large portion of functionally illiterate workers were profound in such a highly competitive business.

One would assume, given these incredible demands for employee literacy and the fact that management was motivated to embark on an educational solution, that this company would take a long-term interest in educating its workers to meet its present and future needs. Unfortunately, this was not to be. During the first year of the program, recruitment for classes went very well, and the results were seen as very positive to both the company and the participants. Yet, after a year, things began to change. The training manager resigned and took a job with a competing company. He was not replaced for over a year, and the responsibility for program contact with CEI was handed to the Personnel Assistant. This person had very little authority within the company, and the program soon ran into problems recruiting workers and getting supervisors' "buy-in." In essence, even with government funding, the program died after 2 years.

Why did this happen? What can we learn from this example? Most obviously, there was not a real commitment from top management. Although they showed an initial interest in the program, attending advisory committee meetings and graduations, they never really developed an appreciation of the benefits of these classes. This indifference sent a message to the workers that these classes were not important and to the supervisors that classes were interfering with work. Unfortunately, this result is not that uncommon.

CEI has been working with businesses in health care, manufacturing, financial arenas, and education for almost 20 years. During this time we have often found that the establishment of an educational program for employees is dependent upon the vision and good will of a particular key manager who has a social conscience and can see the importance of education to the continued improvement of the workplace.

These "lone ranger" managers are people who have an understanding of the company's needs and a long-term vision of what is necessary for the organization to continue to prosper. The question is, *how can these key qualities of management vision and engagement be engrained in areas where they do not exist?* What follows is the story of how CEI came to answer that question.

EARLY HISTORY OF CEI'S INVOLVEMENT IN WORKPLACE EDUCATION

As an organization, CEI experienced a long, gradual evolution into a position of leadership in the field of workplace education. In the earliest phase, CEI began offering education in the workplace, but the courses were not specifically tailored to the workplace environment. The intermediate phase was one of experimentation with integrating workplace needs; and in the latest phase, the *Global 2000* project, a highly effective model was finally developed.

CEI's first experience with workplace education/literacy classes was in 1981 and '82 when the CEI Adult Diploma Program was offered to employees of the First National Bank of Boston (now BankBoston), Blue Cross/Blue Shield, and the Massachusetts General Hospital. However, since the CEI Adult Diploma Program involves classes with a well-defined curriculum leading to a high school diploma, and is not specifically tied to workplace needs, this experience cannot be considered in the category of "workplace literacy."

Several years later, CEI was asked to provide classes in English as a Second Language to employees at Blue Cross/Blue Shield. During these early years the innovative idea was to provide classes in a location convenient to the worker. However, in essence, the curriculum was not much different from that offered in an ESL class anywhere else. Starting in 1987, CEI began for the first time offering classes geared more specifically

to the needs of both the employer and the workers. These first efforts, at companies such as Wang Laboratories and Digital Electronics Corp., while successful in gaining the desired educational outcomes, were not achieving a great deal of impact on the company or plant as a whole.

In 1992, things began to change, as CEI began to develop strategies to inculcate an educational orientation into selected workplaces. CEI was invited to meet with a pilot team of employees at Boston Scientific Corp. to discuss some language communication problems experienced in a particular department due to the fact that the workers came from many different countries – Portugal, Armenia, China, Vietnam, Cambodia, Thailand, India, Guatemala, and the United States. We were asked to work with the team to develop and provide appropriate ESL classes to the workers in this department.

At the end of the 10 weeks (40 hours) of classes, a final meeting was held with the team to learn the results, if any. The wry comment of one manager was that people were now, if anything, speaking too much -- whereas before they had been afraid to ask questions or to point out errors. Significantly, some of the members of the team had been students in the classes, and they were very excited about what they had learned. The assistant supervisor described a before-and-after picture of what he observed. Before the classes, a job change arriving from the engineering department could result in three to four weeks of confusion and mayhem. During the last few weeks of the classes, a job change order arrived and was implemented in a week and a half without the customary turmoil. Production

yields in this department had risen considerably. This improvement was attributed to the fact that workers felt more comfortable asking questions and pointing out problems.

LESSONS LEARNED:
THE GLOBAL 2000 MODEL
NATIONAL WORKPLACE LITERACY PROJECT

In the case described just above, the employee involvement team had proven to be a dynamic, highly effective way of broadening the base of involvement and commitment in education, across all levels from top management to line workers. CEI decided to seek opportunities to utilize the benefits of employee teams elsewhere. In 1994, when the US Department of Education issued the sixth and last round of requests for proposals for the National Workplace Literacy Program, CEI, together with five companies, developed a plan based upon the Employee Involvement Team model.

The National Workplace Literacy Program was set up for the government to fund demonstration projects that could serve as models. In 1986, the US Department of Education issued the first request for proposals. The first five rounds of projects were for 18 months each. The sixth round of funding was increased to three years duration. The plan was that once the federal allocation reached $25 million per year, the program would be administered directly by the states. Unfortunately this never occurred, since Congress eliminated the National Workplace Literacy Program in 1996.

Through six rounds of competition, the government awarded a total of 306 grants. CEI received three of these grants to develop model projects. The first two projects were in the areas of healthcare and included both hospitals and long term care facilities. These two grants, of 18 months each, were educationally successful but, lacking a comprehensive management involvement approach, were unable to sustain the level of commitment necessary to continue the workplace education classes once the public funding had ended.

Because the third and final NWLP-funded project, which CEI entitled *Global 2000*, was for a total of 36 months, it succeeded in proving to several of the participating business that educational programs for workers are as important and necessary as other kinds of investments. In every instance where the programs were continued beyond the grant period, the Employee Involvement Team had taken effective ownership of the process.

Global 2000 was originally a partnership of five manufacturers -- American Engineered Components, Analog Devices, Boston Scientific Corporation, Fire Control Instruments, and NIDEC/Power General -- and the educational provider, Continuing Education Institute. These five companies employed over 1600 people. The project's goal was to educate workers to make them more trainable, more flexible in terms of work assignments, and ultimately more productive.

Global 2000 offered classes in English communication, reading comprehension, business writing, and math. In addition, the CEI Adult

Diploma Program enabled employees to earn a standard high school diploma. The students also learned how to use a computer for word processing purposes. The program began in October 1994.

In 1997, five other manufacturers -- Parker Hannifin-Chomerics Division, Draka Inc., Pillsbury/Rudi Foods, MA/COM, and Spirit, Inc. -- were added. By the end of the project, over 600 workers from the ten companies had enrolled in workplace education classes in reading, writing, and English as a Second Language. In addition, in June 1996, 43 people received their high school diploma through the CEI Adult Diploma Program.

PROJECT MANAGEMENT

EMPLOYEE INVOLVEMENT TEAM AND EXECUTIVE BOARD

The unique and decisive feature of the *Global 2000* project was its management structure, consisting of an Employee Involvement Team and an Executive Board. Each company selected between five and eleven employees, of whom at least two were production workers, to serve on an Employee Involvement Team (EIT). In addition, a company liaison, who was typically either a human resource manager or a training manager, was a member of the Employee Involvement Team, and was usually responsible for carrying out the decisions of the EIT. Representatives from CEI also attended team meetings. For more information on EITs, refer to Attachment A, *National Workplace Literacy Program Employee Involvement Team Model.*

A team's first function was to determine the literacy needs of the company's workforce. Since each company had its own organizational structure and ways of dealing with issues, each EIT used different methodologies. Once the needs were determined, the EIT decided which of these needs to address first and how best to do so. The EIT then recruited the employee/students, assisted in curriculum development to make certain that the program was pertinent to the company and worksite, monitored progress, and helped evaluate the impact.

The Executive Board was comprised of one management official from each participating company, usually a vice president or plant manager; the Executive Director of CEI; the Coordinator of the *Global 2000* project; and four public representatives (the President of the Associated Industries of Massachusetts; a Professor from the Harvard Graduate School of Education; the Director of the Massachusetts Jobs Council; and a Vice President of Jobs for the Future). Quarterly meetings were held at the various companies in rotation. The company liaisons were also invited to attend these meetings.

Over the course of the three-year project, there were ten Executive Board meetings. At an early meeting the Executive Board devised the following charter:

> The goals of the Executive Board are to oversee the *Global 2000* project and to plan and implement the dissemination aspects of the project. To achieve these goals, the Executive Board will accomplish the following objectives:

- Share project information and experience among partners
- Make opportunities to learn from the experiences of others
- Develop measures for determining the effects/cost benefits of educational training on productivity
- Track project progress via project data collection, including NWLIS, budget review, schedule review
- Determine conclusions (hard data) and lessons learned from "soft data" including advice to and from others
- Develop publicity strategies for the manufacturing industry and policy makers
- Conduct workplace education workshops for business/industry

The underlying reason to set up the Executive Board was to bring the workplace literacy program to the attention of top management. In this regard the Executive Board performed its functions very well. Four of the five original companies provided additional classes beyond those offered through the project, as did two of the newer partners. All the meetings of the Executive Board, except for the first one at CEI, were held at the participating companies, and these meetings often included a tour of the facility, which allowed for sharing of information not only about the project but about manufacturing issues as well. In addition, several of the meetings featured guest speakers from other companies or training organizations who offered suggestions about evaluating the project. The outside evaluators also often attended Executive Board meetings to discuss the evaluation plan.

The Board focused primarily on three activities: evaluation; publicizing the program, including production of a video for purpose of dissemination; and political action to promote workplace literacy programs. The Executive Board approved the production of the video, including the script, and made arrangements for the camera crew to film within each company. Several members of the Executive Board, as well as all the liaisons from the five original partner companies, were interviewed for the production. When the video was finished, the Executive Board planned the distribution of the video, including cable and TV stations as well as political and governmental officials.

Several Executive Board members were interviewed for newspaper and business articles, including the *Business and Industry Reporter*, the publication of the Associated Industries of Massachusetts. Two members of the Executive Board and the Executive Director of CEI presented workshops at the 1997 National Alliance of Business Conference in Washington and the 1998 Workplace Learning Conference in Milwaukee.

With respect to political action, in May 1997, the CEI Executive Director and the Manager of Human Resources at Fire Control Instruments were invited at the suggestion of Senator Edward Kennedy to testify at the Senate Committee on Labor and Human Resource's hearing on the re-authorization of the Adult Education Act. In addition, the business representatives of the Executive Board sent letters to Senators and Congressmen about continued funding for workplace education. Finally, two members of the Executive Board from Fire Control Instruments and the

CEI Executive Director met with Congressman Barney Frank to elicit his support for the inclusion of workplace literacy in any proposal for literacy enacted by Congress.

DEMAND FOR WORKPLACE EDUCATION

The *Global 2000* model was intended to convince businesses that investments made in educating workers have as much impact on efficiency and profitability as capital investments such as purchasing new machinery or building new plant. When a company purchases a new piece of equipment, the requirement to train employees to run this new machinery is implicit. The need to acquire computer skills is now a permanent feature of the workplace, and we all know of instances where a software upgrade requires nearly everyone in a company, especially top management, to undergo training.

The fact is that the computer age demands a more literate worker, one who can effectively read, write, and communicate his or her ideas and knowledge. For example, it is not unusual for work instructions to be given on a computer monitor requiring reading and English skills. Yet, experience has shown that many workers need instruction in basic or foundation skills in order to learn how to operate equipment or computers. Furthermore, subjects learned in high school, such as algebra, may not be remembered if never used. It is by no means safe to assume that education received in the 1970s or 1980s or even earlier is appropriate for the 1990s.

In addition to the common need of workers who attended school in the United States to relearn forgotten knowledge, all the companies involved in the *Global 2000* project had large numbers of limited-English-speaking employees who had never attended school in this country and required classes in English as a Second Language. These workers were limited in their ability to learn new jobs and could not be effectively cross-trained. They could not speak to their supervisors and they required interpreters for everything -- including company meetings. The major goal of these businesses, therefore, was the creation of a more unified workforce where people could be easily trained and shifted among jobs as needed. From this achievement, other goals, such as increased productivity, greater yields, less waste, and improved safety, could be expected to follow.

GOALS

When the *Global 2000* proposal was written, the businesses set three main goals:

1. Improve the productivity of the workplace in order to improve the product quality of the *Global 2000* partner worksites.
2. Empower employee/participants to advance in their jobs, improve job performance and retain their jobs.
3. Demonstrate a model of a successful workplace literacy project in the manufacturing industry through the formation of an integrated partnership including an educational provider and a workplace advisory team.

The Employee Involvement Team of each of the partner companies then determined their own company-specific goals. The goals set at the team meetings of the various partner companies during the first six months were, in essence, very similar. These included:

- improve product quality
- increase productivity
- improve safety
- place employees in self-directed work teams
- increase employees' ability to read and understand company information in order to participate more fully in the company
- decrease technical/engineering support needed for equipment operation
- create a more versatile workforce
- decrease time needed for training
- change company culture.

Within each company there were product-specific goals as well. These are mentioned in the individual Company Reports. During the first 6 months of the *Global 2000* project, there were a total of 44 Employee Involvement Team meetings involving 50 people. After selecting their goals, the teams developed surveys for both the workers and their supervisors. Copies of these surveys, or "Needs Assessments," and the results are attached to the Company Reports.

The EIT at Fire Control Instruments (FCI), for example, constructed a needs survey listing fifteen particular skills that employees used on the job. FCI is a manufacturing company which at that time had 106 employees, twenty of whom were assemblers whose first language was not English and who needed basic education in reading, writing, and above all speaking English. Each of these employees was individually interviewed by a member of the EIT to determine ability in each of the fifteen skill areas, such as speaking clearly, explaining problems and reading documents. The EIT held the survey in February 1995, before the ESL classes began. Table 1 shows the results. In every item but filling out a time sheet, at least 30% of the workers could not complete the task accurately.

TABLE 1: PRE- AND POST-TRAINING RESULTS

This employee can...	PRE-TRAINING (1995) YES	A LITTLE	NO	POST-TRAINING (1996) YES	A LITTLE	NO
1. Speak clearly	10%	55%	35%	40%	55%	5%
2. Explain problems	15%	55%	30%	70%	25%	5%
3. Relate information from meetings to co-workers	20%	40%	40%	40%	55%	5%
4. Understand verbal instructions & key terms	30%	30%	40%	75%	20%	5%
5. Read documents	15%	35%	50%	50%	40%	10%
6. Read & follow procedures	15%	35%	50%	65%	30%	5%
7. Read & understand performance review	10%	55%	35%	40%	60%	0%
7. Read & understand safety signs	45%	25%	30%	80%	15%	5%
9. Read & understand work instructions - visual aids	55%	15%	30%	90%	5%	5%
10. Read & understand company policies	10%	50%	40%	25%	65%	10%
11. Make accurate math calculations	70%	0%	30%	80%	15%	5%
12. Convert fractions to decimals	25%	20%	55%	55%	30%	15%
13. Fill out time sheet	95%	0%	5%	95%	5%	0%
14. Explain in writing part defects	15%	40%	45%	40%	40%	20%
15. Write clearly	5%	40%	55%	15%	65%	

CLASSES

Once the EIT had determined the literacy needs of the workforce, it decided the subject areas to be addressed – reading, math, writing, or ESL. If, for example, a company had some workers who spoke some English but could not read or write, and other workers who spoke no English and were also illiterate in their native language, the EIT had to choose whether to give priority to one group or the other. Often such decisions were based on the amount of time necessary to effect change. Team members were aware that teaching an illiterate person to speak English could take all of the three years allocated by the grant. In the case of FCI, the decision was made to provide ESL classes to the 20 assemblers for the three years. By contrast, at Boston Scientific Corporation, where there was a larger workforce, it was decided that each individual would be eligible for only 15 weeks of class time, a total of 60 hours. The EITs in all the companies decided to focus on Reading and Writing and ESL classes; no math classes were offered.

According to the *Global 2000* plan, each partner company had two classes meeting twice a week for two hours at a time. After the EIT had decided on the type of classes to be offered, CEI staff met individually with each potential student to determine his or her ability to communicate in English and personal goals for taking these classes. In those more advanced classes which focused on reading and writing, CEI staff administered a pre- and post-CEI Reading Assessment measuring ability in grade levels. Testing per se in ESL classes was kept to a minimum so that learners could concentrate on increasing their confidence in English.

CURRICULUM DEVELOPMENT

Curriculum Development in the *Global 2000* project covered a wide range of topics and issues, but the ones of primary concern were pronunciation strategies, adapting workplace materials, expanding the use of English into the workplace and the use of computers to augment instruction. The Curriculum Development topics described below are a summary of some of the curriculum issues addressed in the *Global 2000* project. A more complete of the curriculum of each partner company is given in the Company Reports.

Pronunciation Strategies

Giving learners strategies for pronouncing basic words in English is vital. The primary strategy in teaching pronunciation in English is to learn to differentiate between the vowel sounds. All the vowels in English have at least two distinct sounds – long and short. The clue to the long sound (i.e., the vowel's *name*), is often a soundless 'e' on the end of the word such as 'made' or double vowel in the middle, such as 'maid'. The absence of clues signals a different sound -- the short sound as in 'mad.'

CEI staff has developed a series of exercises

improving their ability to read in English. These exercises are designed to challenge the learner incrementally or for different level classes.

All level of learners in the *Global 2000* project learned pronunciation strategies. They also were reminded to practice, practice, practice. Children act as enthusiastic sounding boards, and tutors have a ready-made lesson. A book of graduated lessons in pronunciation are included in the CEI National Workplace Literacy Partnership compilation of products (Item 5).

Adapting Workplace Materials

Many company managers assume that workplace education means workplace documents, technical terminology and workplace conversational jargon only. While focusing on a workplace curriculum exclusively is the goal of all workplace educational training programs, some accommodation needs to be made for the needs of the learners. When the balance of work-related lessons exceed life ones, learners will complain, "I've just spent eight hours dealing with this stuff, I want to think about something else." Learners do want to be able to communicate more at work, to be able to read documents and to understand all instructions, but they can learn the skills the workplace requires better in other than workplace contexts.

Part of what employees learn about their jobs is what is required of them relative to the paperwork which accompanies each order. Employees can look at a document and tell you what it refers to. Very few can actually read and comprehend what the document says. Comprehending company documents is an important part of any workplace education curriculum. The

challenge lies in getting the attention of the employee/participant. The direct approach -- the "Let's take this X106B procedure apart, students" -- is a guaranteed turn off. All employees claim familiarity with company documents. CEI staff does not introduce the actual company document until at the conclusion of a different series of lessons. Instead, the staff looks elsewhere to similar processes, for instance, to using an ATM, assembling a child's toy, preparing a recipe.

All documents can be looked at from the standpoint of their organization, their parts, sequences and language. Most directions, for instance, will use a numbering sequence or signals, such as 'first,' 'second,' etc. Directions utilize the imperative verb form – place this, fasten that, etc. Another way to disguise a familiar document is to cut it apart and rearrange the steps. Participants need to pay attention when fixing a deliberately messed-up procedure. Interjecting new or irrelevant information into a document is a good test of a learner's ability to scan a document for correctness or changes. By the time participants have grappled with numerous kinds of processes, they are willing to attend to the company ones since they have developed a number of skills for decoding them.

Another aspect of adapting material for the workplace is the change in an age-old relationship. Most instructors will find company documents incomprehensible. They will need to rely on their employee/learners to explain everything so they do understand. The participant/instructor relationship shifts from learner/expert to participant as expert, the instructor

as learner; they now are collaborating. Collaboration is also an important component of working effectively with adults.

Expanding the Use of English into the Workplace

Educational training in the workplace cannot be accomplished in the isolation of the classroom. The more management and co-workers can become involved in the process of learning, the greater the effect of the training. When employees are engaged in improving their communication skills in English, the support and involvement from others in the company is vital. Part of the process of learning another language is that of changing social and personal habits. Many participants in a workplace English as a Second Language class have arranged their lives and work so they remain within the confines of their own language group. For the learner to succeed, s/he needs to move into uncharted waters and practice newly acquired language skills.

Most companies are not prepared to reorganize their workforce to accommodate language learning, so curriculum development in the workplace needs to expand from the classroom to the production floor. Employee/participants can be given activities that utilize the worksite, such as copying signs on machinery, on walls, on paths. They can ask co-workers to help them define terms and make drawings, where appropriate. More advanced English learners can do the leg-work to develop a comprehensive flow chart of a product. A different approach is for participants to invite supervisory and management personnel into the classroom to be interviewed.

In preparation for these events, participants need to learn how to form the questions and determine which questions are appropriate to ask. Without guidance, participants will ask personal questions about age, weight and salaries of their guests.

Computer Aided Instruction

In several *Global 2000* partner-companies, CEI established computer stations for the purpose of giving employee/participants experience in using computers and to give them additional ways to experience learning. The first hurdle in setting up the stations was to find space and an unused computer or two within the company. The next challenge was in scheduling participants for training in accessing the computer programs. The insurmountable hurdle turned out to be scheduling time for participants to use the computers. Meal and break times were already filled; before and after work time was not to be allocated to computer use. The computers installed in the classrooms were rarely touched because participants seemed to feel self-conscious about using the computers when others were occupied in other ways. The one participant who logged a lot of computer time was a 3rd shift maintenance worker.

The specifics of Curriculum Development in each worksite is discussed in more detail in the Company Reports (Item 2).

ADULT DIPLOMA PROGRAM

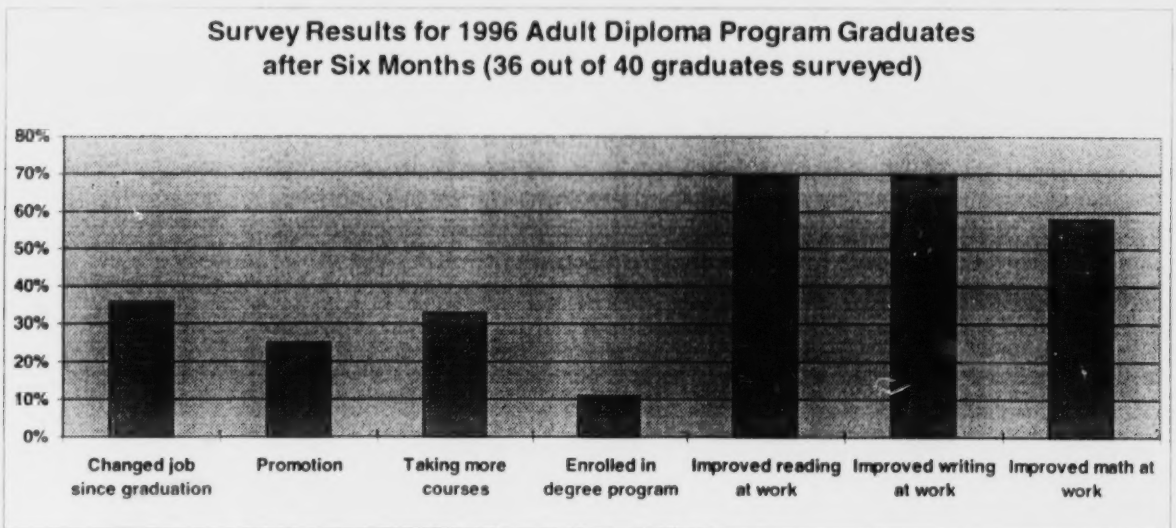
CEI's Adult Diploma Program (ADP) is a unique strategy to enable adults to earn a standard high school diploma. It combines quality instruction, counseling and tutoring with a Life/Employment Skills Workshop that encourages participants to investigate, analyze and demonstrate skills learned through their experiences. Once participants know their interests and strengths, they learn how to focus on improving their skills base to become better workers and citizens who are more able to realize their potential.

Since 1982, over 750 adults have earned their high school diplomas from a private high school in Boston, Massachusetts through the CEI Adult Diploma Program (ADP). Most ADP participants are employed and attend classes at their workplace. In order to earn the diploma, students must take classes in reading, writing, math, science, US history and a unique career exploration segment called the Life/Employment Skills Workshop. CEI curricula emphasize communication, problem solving, presentation and computer skills. In every course reading, writing and critical thinking skills are emphasized. Each participant has an individual portfolio which contains at least three samples to demonstrate writing competency. In addition each person must prove high school level competence in reading by passing a standardized test.

Applying the Adult Diploma Program's methodology to the *Global 2000* project yielded excellent results. A survey of 1996 graduates of the Adult

Diploma Program in the *Global 2000* project was conducted and 36 of 40 graduates (90%) were contacted. Of the 36 graduates surveyed:

- 13 (36%) have changed jobs since graduation.
- 9 (25%) have already been promoted since graduation.
  8 of these (89%) credit their participation in the Adult Diploma Program for their promotion.
- 14 (39%) have more responsibility on their jobs.
  8 of these (57%) credit their participation in the Adult Diploma Program for their increased responsibility.
- 12 (33%) have continued their education.
  9 of these (75%) say they were well prepared for further education by their participation in the Adult Diploma Program.
- 17 (47%) are planning to continue their education.
- 4 are enrolled in college or technical school working toward a degree.
- 25 (69%) improved reading skills used at work.
- 25 (69%) improved writing skills used at work.
- 21 (58%) improved math skills used at work.
- 24 (67%) believed the Life Employment Workshop helped them decide on future employment goals.
- 30 (83%) recommended the program to others.



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EVALUATION

Evaluating workplace literacy programs is different from evaluating other literacy or education programs in general. In most educational programs the evaluation is based on the performance of the individual student only. In many instances, there are pre-and post tests to show progress while in other cases there maybe certain competency measurements that are required before the student is deemed proficient, skilled or knowledgeable.

In workplace education or literacy programs there is a second dimension that is as important but often overlooked since it is harder to measure. This dimension is the relationship between the knowledge gained in the classroom and the change in performance in the workplace. How does the employer view the employee's newly acquired skills? Can the employer see any difference and can this difference be measured in any meaningful way?

If a business decides to offer its workers training or educational programs, there should be some benefit that ultimately effects the profit line or return on investment, such as reducing re-work. What makes this kind of evaluation most difficult is the fact that there may be several reasons for an improvement in efficiency or quality, of which attendance in a literacy class may be only one.

FORMATIVE EVALUATION

To determine the effectiveness of the *Global 2000* project, CEI decided to conduct two kinds of evaluation – one formative during the program itself and the second by the external evaluator.

The formative evaluation was done at the mid-point of the project by Deborah Tuler, an evaluator with expertise in qualitative measures. Tuler was hired to determine:

(1) what teachers, students, and company personnel liked (strengths) and disliked (weaknesses) about the program;

(2) the program's achieved goals; and

(3) whether additional goals or expectations had emerged.

In each of the four original companies selected (Analog Devices, Boston Scientific Corporation, Fire Control Instruments and Power General), Tuler conducted focus groups and interviews with students, members of the employee involvement teams, previous students, and teachers. She also spoke with CEI staff involved in designing and administering the project. A copy of the evaluation report is attached (Item 8). What follows is a summary of the report.

Strengths and Weaknesses

With respect to the classes themselves, respondents at Boston Scientific found that the strategy of targeting one or two departments at a

time was a strength because, with the whole department being brought into the program at once, participants got strong support from their supervisors and co-workers. However, the fact that students could only participate for 15 weeks, because of the large numbers of workers who needed ESL classes, was felt by all to be a weakness. At Analog Devices, the respondents liked the time of the classes and the opportunity to use what they learned. Students were able to serve as role models for other workers. At Fire Control Instruments as at the other companies the teachers were considered good but were not strict enough. One of the weaknesses felt by all the teams was the inability to evaluate the classes in term of company goals.

Most of the feedback concerned the Employee Involvement Teams. Across all the companies, the Employee Involvement Teams were seen as successful due to their composition, representing workers from different levels and departments of the company. At Fire Control Instruments the team was considered strong because the members worked directly with the students. The team also implemented two additional components, tutoring/mentoring and pre/post surveys, which were considered to be strengths of the program.

At Power General, the EIT gave mixed reviews. Its strength was its composition of representatives from different areas of the company, while its weaknesses were the infrequency of meetings, the lack of consensus on the part of the members, and the lack of participation of some of the members due to their perceived inability to speak English. It should be pointed out that by the end of the project, those team members whose first language was

not English had made substantial English language gains as students in the program and were participating more actively in the meetings. Unfortunately, at Power General, the responses were all in written form because the focus group was canceled, so Tuler was not able to determine the validity of the comments.

Achieved goals

Tuler made a number of findings on the question of whether the goals as originally laid out in each company had been achieved. The following are some of the major findings. At Analog Devices, it was noted that workers had begun to read the procedures and ask for help when necessary. "A wall came down," one manager commented, with people from different language backgrounds speaking English to each other. There was an increased comfort level to speak English in the company.

Similarly at Boston Scientific, there was noticeable progress with workers increasingly willing and able to point out errors in written procedures and in other ways demonstrating they were able to read. Employees made more suggestions for improvements. People involved in the program had been promoted, had taken on more responsibility, and had received company recognition rewards.

At Power General, the participants showed increased confidence in asking questions, not using interpreters, writing notes to the following shift, and checking documents before starting a job. At Fire Control Instruments,

the members of the team felt they had achieved more than they had expected because they had understood from the beginning that they were involved in a long-term process. The students now spoke more English and asked questions that demonstrated critical thinking.

CEI'S PROJECT EVALUATIONS

When the project ended, CEI's Coordinator of the *Global 2000* Project, Katherine Archer, wrote reports on each of the member companies. In addition, the CEI Executive Director, Dr. Lloyd David, taped interviews with both management and workers from seven of the partner companies. All the interviews were later transcribed, and some of the transcriptions are included in the company reports, which are attached.

The main purpose of the interviews was to determine the "unexpected outcomes" of the project -- the gains that student/participants made because of having been in a class which were not anticipated when the program began. Often these outcomes had a significant psychological impact on the individual and a positive effect on their job performance. One example of this is the story of a member of the team at Power General who said that she no longer was afraid to go on the public address system in the factory when she needed to find a person. Before this experience, if she needed to find someone, she would ask another worker to speak for her, or would run around the entire factory floor looking for the individual. Now that she felt confident to go on the intercom, a great deal of time, stress and frustration was spared, and a great sense of accomplishment and success was achieved.

Other unexpected outcomes came in the form of changed practices. For example, Fire Control Instruments' Human Resources staff changed hiring practices because of what they learned about the skills needed to perform certain jobs from the results of the Needs Survey developed by the Employee Involvement Team.

EXTERNAL EVALUATION

One requirement of the grant issued by the US Department of Education was to hire an External Evaluator for the project. Maribett Management Group (Ron Maribett and Marilyn Kobus) was selected to conduct an evaluation to determine:

1) Specific applications of learning on the job
2) Business impacts of learning on the job
3) Barriers to learning and its implementation.

The summary of the findings by the external evaluator is attached (Item 9).

Through an innovative approach called Field Action Testing, employing 1 ½ - 2 hour long structured interviews, these researchers were able to tie the learning from the program to specific actions and consequences on the job. All students interviewed mentioned pronunciation, grammar, comprehension, reading and writing, as key areas in which they felt they had improved significantly. These improvements impacted the

business in the following ways: more effective verbal communication, greater efficiency, a willingness to contribute ideas, greater capacity for expanded job responsibilities, and lower error rates.

The ESL classes taught people to communicate better, producing a wide range of cost saving results as exemplified by the following: the respondents spent less time with supervisors, allowing them to do other work besides constantly monitor the workers; the need for interpreters was eliminated, which saved the company money; the amount of errors was reduced because more questions were asked when the worker was not certain of a process; rework was thereby reduced because the process was done correctly the first time.

Because of improved language abilities, workers were able to take on new projects. Students were more willing to ask for clarification or were able to read thereby producing lower rates of error in their work. The Maribett Group determined that the ESL classes for one worker saved a company $875 per year because the worker did not need to ask the supervisor about engineering change orders. In a second case a worker did not request the help of a technician as often because she could read and understand written procedure herself, saving the company substantial lost time. In a third case a worker saved the company $7000 a year by having the courage to speak up and describe the elimination of a step in the production process that saved 2-3 minutes every time the process was run. Several of the respondents mentioned benefits gained in their daily lives as well, such as when visiting a doctor, helping children with schoolwork, or filling out an application.

In addition, several best teaching practices were reported by the students to have been used by the teachers. These were:

- soliciting input from the class about curriculum
- understanding and valuing differences
- creating a group feeling
- helping students with correct pronunciation
- having a variety of class activities with correct pacing, and
- creating interesting homework assignments.

In sum, the research identified specific on-the-job actions that were driven by the learning gained during the GLOBAL 2000 program and identified the consequences of these actions including the impact on the bottom line. Since educational gain is individualistic, it is really not possible to determine return on investment in a particular class or program without looking at each individual student's impact. This is a very time consuming process, but the information that was gained in this case points to considerable value to the company.

DISSEMINATION ACTIVITIES

The major points of discussion at the meetings of the Executive Board of the *Global 2000* project involved dissemination about the program both within the respective companies and to the general public. Analog Devices and Power General set up a bulletin board near the cafeteria and continuously updated it with information about new classes and pictures of

graduation ceremonies. Boston Scientific, Analog Devices, and American Engineered Components put articles about the program in company newsletters. Articles were printed in the *Business and Industry Reporter*, the newsletter of the Associated Industries of Massachusetts, and in local newspapers. The winter 1996 CEI Newsletter also featured the *Global 2000* project.

Early on in the project, the Executive Board decided to produce a video about the project and hired Joshua Seftel, a producer of several documentaries for the Public Broadcast System. The video was filmed at Boston Scientific Corporation, Fire Control Instruments, Analog Devices, American Engineered Compontents and NIDEC/Power General as well as at the offices of CEI. It focused on the need for workplace education/literacy programs, the ESL and Adult Diploma Programs offered by *Global 2000*, and the benefits derived from them.

A committee was formed to develop a formal presentation to accompany the video. The committee members assumed that the audience for the video would to some extent have recognized the need for workplace literacy training. The message of the presentation, then, was not the story of *Global 2000*, or how to get government funding, but *Global 2000* as a process model. The presentation was titled with the acronym **A.C.T.I.V.E.** to emphasize that the model provides ***A**ccountability* to business needs; is ***C**ollaborative*, bringing together business, government, educational provider, and students into a consortium; is ***Team***-based using the Employee Involvement Team model; offers a rich ***Involvement*** process of continuous learning and a relationship with the educational provider; delivers ***Value***,

with an ability to manage change and meet companies' educational goals; and strengthens performance-based goals with *Evaluation*.

The video has been shown at several national conferences, including the 1997 Workplace Learning Conferences in Milwaukee, the 1997 National Alliance of Business conference in Washington, D.C., and the NETWORK Conference in Cleveland. It has also been featured at meetings in Massachusetts such as the Massachusetts Extended Care Federation and the Massachusetts Leadership Forum at Holy Cross College. The video was shown at the participating companies and at orientations for new students of the CEI Adult Diploma Program. Lastly, copies of the video were sent to local cable television stations.

CONCLUSIONS

The keys to the success of *Global 2000* begin with strong management involvement and support, embodied in the Executive Board; the inclusive, multilevel structure of the Employee Involvement Teams; and the opportunity for feedback which these structures created. This feedback through the teams was essential to the crowning feature of the project -- the *customization* of the learning program to fit the particular conditions of each partner company. The curricula, of the educational staffing and methodology, and of the composition of the teams themselves were all tailored to each company's characteristics and needs.

The consortium approach enabled those managers from the partner companies who formed the Executive Board to meet in a neutral arena that was comfortable and provided specific functions and within in a logical timeframe. They had a role to play which was not merely advisory and they took their job seriously. The heaviest lifting, of course, was done by the members of the Employee Involvement Teams, who effectively took ownership of the projects, and any success ultimately belongs to them.

With respect to the educational component, CEI staff benefited from a relationship in which they were seen as real partners and were able to play the role of trusted educational consultants. Curriculum was designed to meet the needs of the company as determined by the team and the desires of the individual students. Teachers were hired based on the personality of the class, the culture of the company, and their own abilities and knowledge of the subject matter. Most importantly, the instructors were trained in proper procedures of workplace education and were supervised to make certain that the customized curriculum was working effectively in the classroom. One of the persistent problems with workplace education is the lack of trained instructors and the scarcity of workplace-specific training.

Finally, *Global 2000* succeeded because the workplace, where people spend a large proportion of their time, is a natural location for such education. It is convenient and safe, and the things that are learned there can be applied immediately. The results are seen by the participants, their co-workers, and their managers, and this is very gratifying to all concerned. The recognition that comes with learning in the workplace is expressed in

inspiring celebrations that bring management and workers together to honor an accomplishment that is both personal and beneficial to all present.

How many businesses are in a similar position but do not know about resources such as the Continuing Education Institute and the National Workplace Literacy Program? On some level, the need for workplace education affects every organization. Illiteracy impacts corporations, families and the society as a whole, and with the National Workplace Literacy Program, government showed that it has an effective role to play in alleviating illiteracy. Every citizen should have a right to get the education he or she needs, and the workplace is among the best places to receive that education. This approach makes good sense, both economically and socially. In fact, by centering educational efforts in the workplace, projects like *Global 2000* bring these two ever-present needs -- economic and social progress -- together with extraordinary effectiveness.

ATTACHMENT A:

LIST OF GLOBAL 2000 PROJECT REPRESENTATIVES

GLOBAL 2000 EXECUTIVE BOARD MEMBERS

Appel, Arthur Executive Vice President	Fire Control Instruments 269 Grove Street Newton, MA 02166-2295
Archer, Katherine ESL/ABE Program Director	Continuing Education Institute, Inc. 108 Water Street Watertown, MA 02172
David, Lloyd Executive Director	Continuing Education Institute, Inc. 108 Water Street Watertown, MA 02172
Gould, John President Mayer, Andre Sr. V.P., Communications & Research	Associated Industries of Mass 222 Berkeley Street Boston, MA 02116
Hassey, Kathy Global 2000 Program Assistant	Continuing Education Institute, Inc. 108 Water Street Watertown, Ma 02172
Hornsby, Gene Director of Operations Palumbo, Bill, Plant Manager	Analog Devices, Inc. One Technology Way Norwood, MA 02062-9106
Miller Shell, Deborah Corporate Trainer	BIW Cable Systems, Inc. 22 Joseph E. Warner Blvd. No. Dighton, MA 02764
Kazis, Richard Vice President, Policy and Research	Jobs For The Future One Bowdoin Square, 11th Floor Boston, MA 02114
Keenan, Thomas President & CEO	NIDEC/Power General 152 Will Drive Canton, MA 02021
Peter Koch Director	Mass Jobs Council 19 Staniford Street, Hurley Building Boston, MA 02114
McGinn, Noel Professor Emeritus, Harvard University	52 Robbins Arlington, MA 02174
May, Les, ED.D. TQM/HRD Director	Parker Hannifin Corporation Chomerics Division 77 Dragon Court Woburn, MA 01888-4014
Schoonmaker, Kathleen Vice President, Operations	American Engineered Components 145 Newton Street Brighton, MA 02135
Wilson, John Vice President, Operations Jamie Rubin, Vice President, Human Res	Boston Scientific Corporation 480 Pleasant Street Watertown, MA 02172

GLOBAL 2000 EXECUTIVE BOARD ALTERNATES

Courtney, Tom Personnel Manager	American Engineered Components 145 Newton Street Brighton, MA 02135
Kelly, Jean Manager of Training	Boston Scientific Corporation 480 Pleasant Street Watertown, MA 02172
King, Linda Training Specialist	Parker Hannifin Corporation Chomerics Division 77 Dragon Court Woburn, MA 01888-4014
Maribett, Ron External Evaluator	Maribett Group 269 Elm Street Kingston, MA 02364
Prather, Marian Sr. Planner Sabourin, Carol Document Supervisor	Analog Devices, Inc. One Technology Way Norwood, MA 02062-9106
Proctor, Beth Manager, Human Resources	NIDEC/Power General 152 Will Drive Canton, MA 02021
Solomon, Lois Director of Training	M/ACOM 1011 Pawtucket Boulevard P.O. Box 3295 Lowell, MA 01853-4399
Thoms, Lois Mgr., Human Resources	Fire Control Instruments 269 Grove Street Newton, MA 02166-2295

ATTACHMENT B:

PROGRAM STATISTICS

Number of unique students from Global 2000 partner companies enrolled in CEI courses:

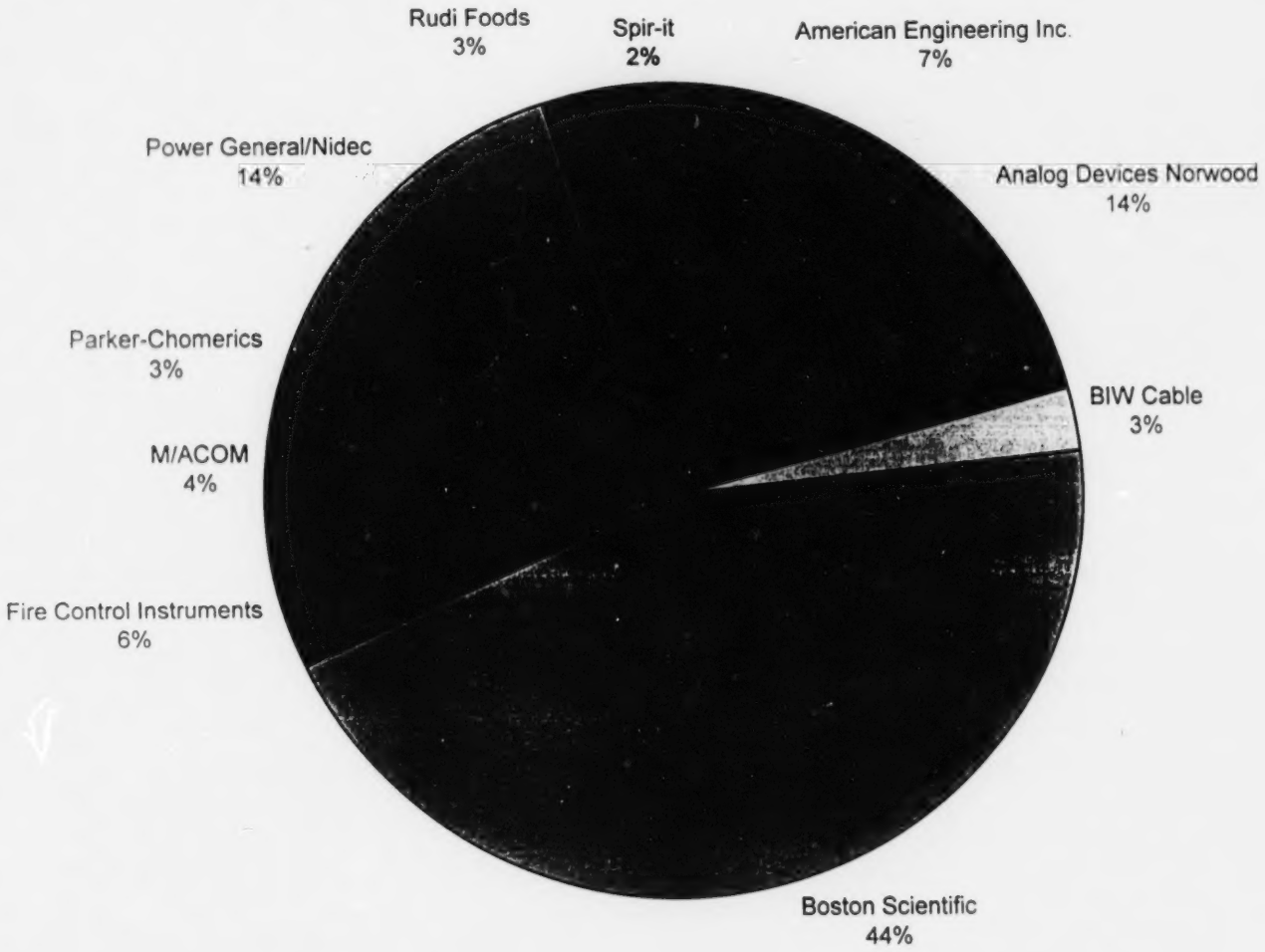
As of: 6/30/98

ESL	**Through Global 2000**	**Company-sponsored**	**Total**
American Engineered Components	28		28
Analog Devices	50	42	92
BIW Draka	11	10	21
Boston Scientific Corporation	152	123	275
Fire Control Instruments	24	16	40
MA/COM	15		15
Parker Hannafin - Chomerics	12	33	45
Nidec/Power General	54	24	78
Rudi Foods	14		14
Spir-It	7		7
Totals:	*367*	*248*	*615*

ADP	**Through Global 2000**	**Company-sponsored**	**Total**
American Engineered Components	1		1
Analog Devices	6	8	14
Boston Scientific Corporation	38	20	58
Fire Control Instruments	2	6	8
Nidec/Power General	3		3
Parker Hannafin - Chomerics		15	15
Totals:	*50*	*49*	*99*

Grand Totals:	*417*	*297*	*714*

All Students by Company



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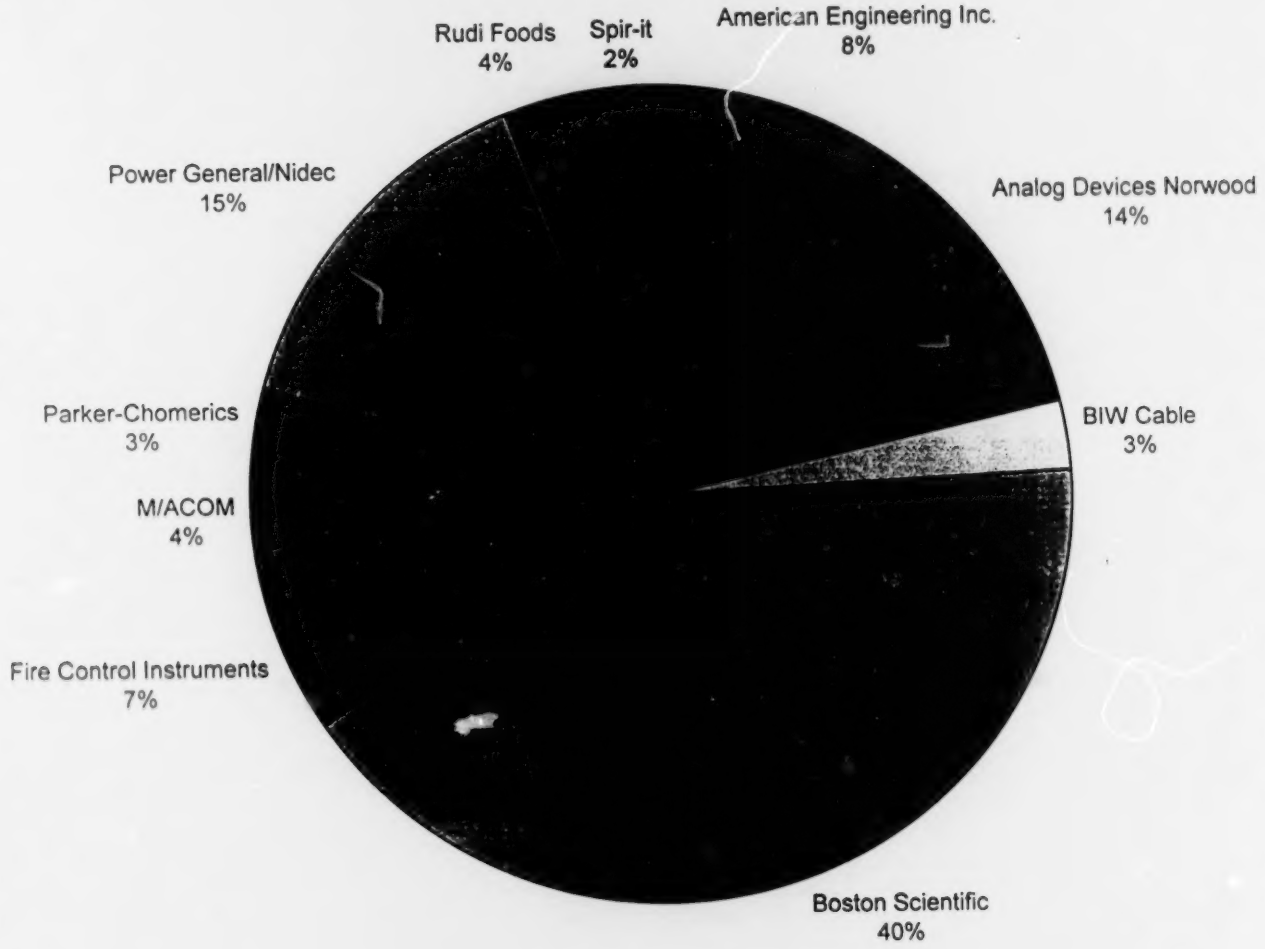
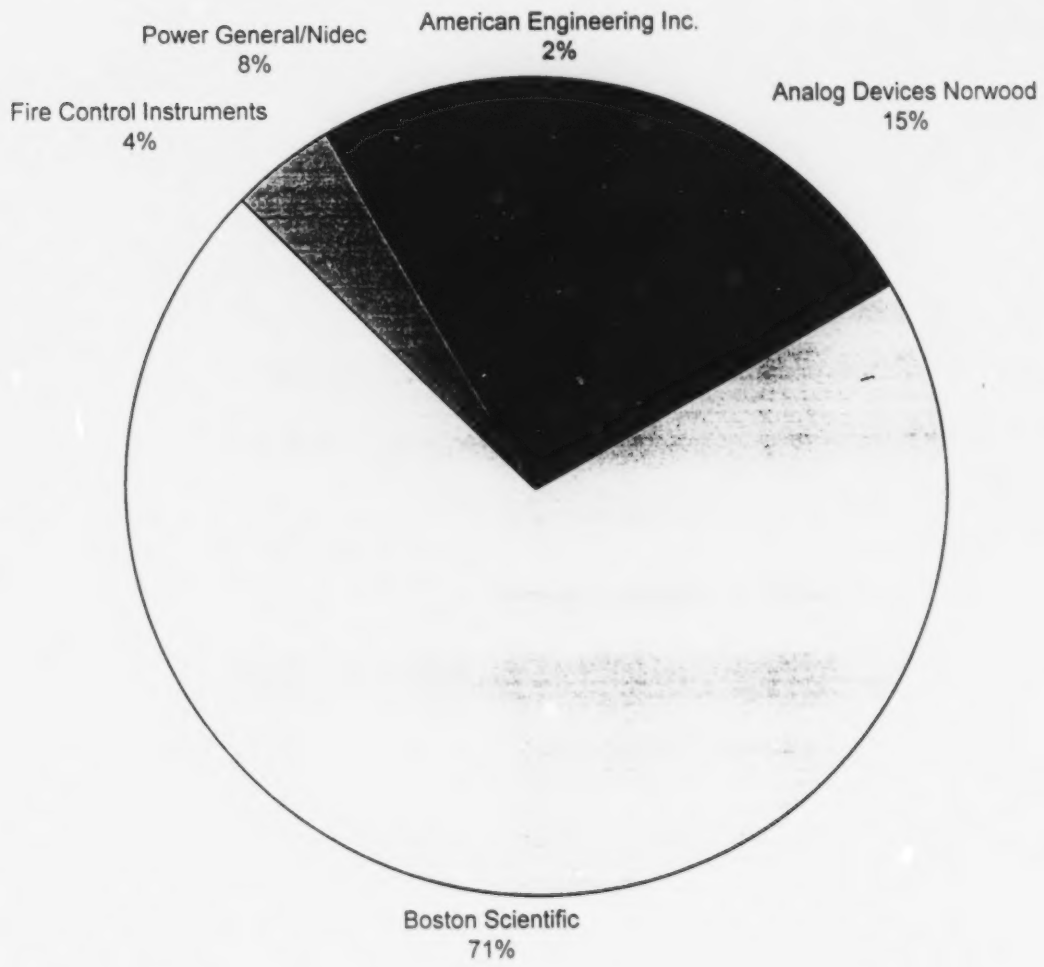
ESL Students by Company

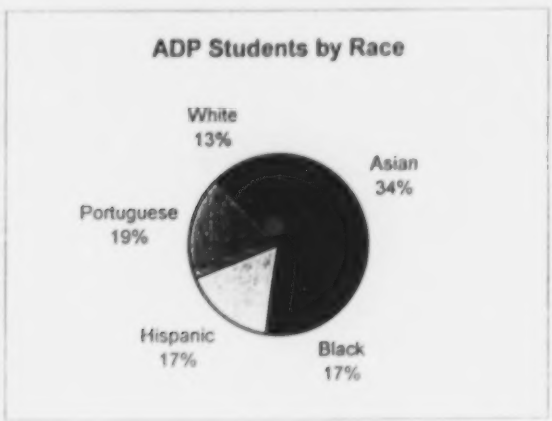


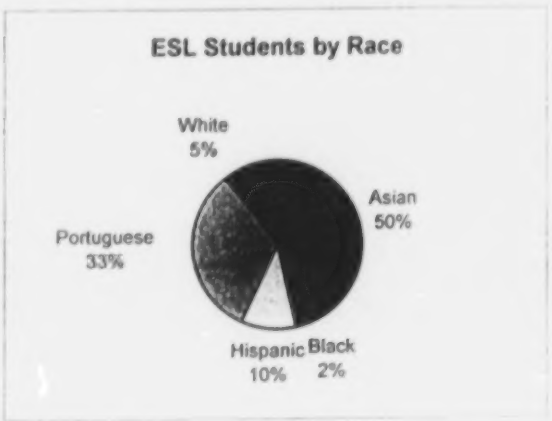
ADP Students by Company

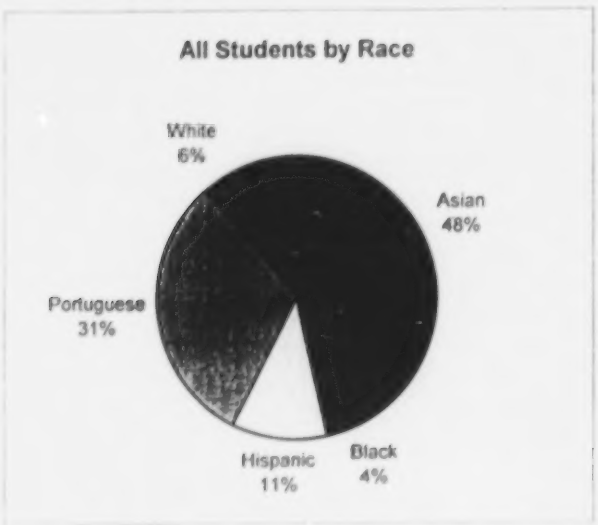


Race Statistics for Unique Students in Global 2000 Classes

	ADP		ESL		TOTAL	
Race	Number	Percent	Number	Percent	Number	Percent
Asian	17	35.4%	182	50.0%	199	48.3%
Black	8	16.7%	7	1.9%	15	3.6%
Hispanic	8	16.7%	38	10.4%	46	11.2%
Portuguese	9	18.8%	119	32.7%	128	31.1%
White	6	12.5%	18	4.9%	24	5.8%
TOTAL	48		364		412	







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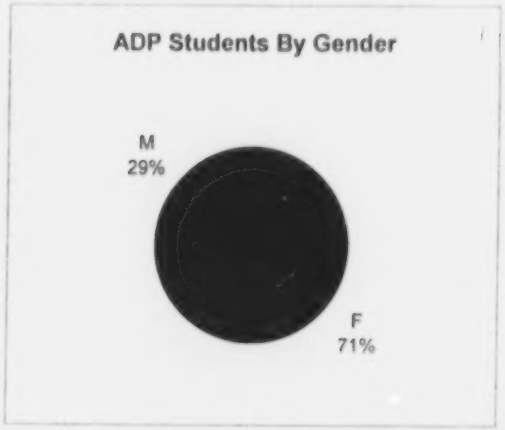
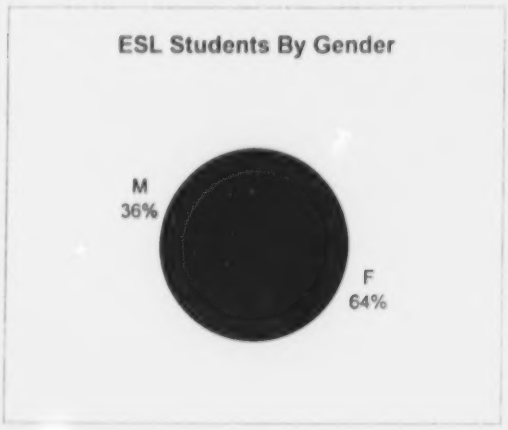
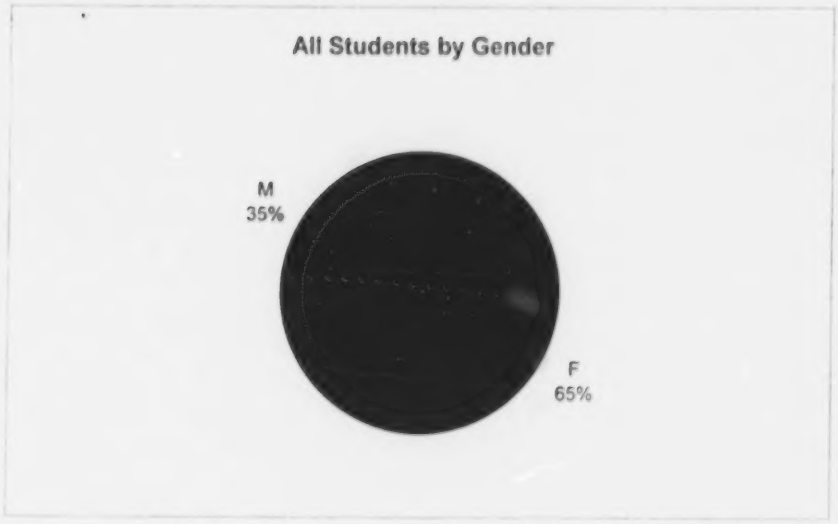
Gender Statistics for Unique Students in Global 2000 Classes

	ADP		ESL		Total	
Gender	Number	Percent	Number	Percent	Number	Percent
F	34	70.8%	233	63.8%	267	64.6%
M	14	29.2%	132	36.2%	146	35.4%
TOTAL	48		365		413	







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Global 2000 Students: Average Ages and Years with Company

Type	Average Age	Average Years with Company
ADP	39.1	5.9
ESL	41.3	6.7
All Students	41.0	6.6

Company	Average Age	Average Years with Company
American Engineering Inc.	49.6	18.4
Analog Devices Norwood	45.2	16.3
BIW Cable	40.5	5.4
Boston Scientific	39.1	2.4
Fire Control Instruments	42.6	6.5
M/ACOM	38.0	5.4
Parker-Chomerics	45.2	6.6
Power General/Nidec	41.5	5.8
Rudi Foods	33.0	4.5
Spir-it	30.0	4.7

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Global Course Counts by Company, Course, Race

Site	Title	Race	CountOfSSN##
American Engineering Co.	AEC Basic Lang Skills 02	Portuguese	8
		Asian	1
		Portuguese	1
	Sum		10
American Engineering Co.	AEC Basic Lang Skills 03	Portuguese	7
		Asian	1
		Portuguese	1
	Sum		9
American Engineering Co.	AEC BasicLangSkills 01	Portuguese	8
		Asian	2
		Portuguese	3
		White	1
	Sum		14
American Engineering Co.	AEC Read/Writing Skills01	Black	1
		Hispanic	1
		Portuguese	1
		Asian	1
		Portuguese	5
		White	3
	Sum		12
Summary for 'Site' = American Engineering Co. (16 detail records)			
Sum			45
Percent			5.58%
Analog Devices Norwood	ADI ESL01	Asian	1
		Portuguese	10
		Portuguese	1
		White	1
	Sum		13
Analog Devices Norwood	ADI-02	Portuguese	13
		Portuguese	2
	Sum		15
Analog Devices Norwood	ESL Basic Cont.	Asian	3
		Portuguese	5
		White	1
		Asian	1
		Portuguese	1
		White	1
	Sum		12
Analog Devices Norwood	ESL Intermediate	Asian	1
		Portuguese	11
		White	1
	Sum		13
Analog Devices Norwood	ESL Intermediate Cont.	Asian	1

Global 2000 Classes by Company and Type of Class

	Unique Students			Enrollments			# of Classes		
Company	ADP	ESL	Total	ADP	ESL	al Enrollme	ADP	ESL	Total
American Engineering Inc.	1	28	29	6	45	51		4	4
Analog Devices Norwood	6	50	57	36	104	140	6	8	14
BIW Cable		11	11		11	11		1	1
Boston Scientific	34	152	186	188	154	342	12	10	22
Fire Control Instruments	2	24	26	12	80	92		8	8
M/ACOM		15	15		15	15		1	1
Parker-Chomerics		12	12		12	12		1	1
Power General/Nidec	4	54	58	21	100	121		8	8
Rudi Foods		14	14		14	14		1	1
Spir-it		7	7		7	7		1	1
									0
TOTAL	47	367	415	263	542	805	18	43	61

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ATTACHMENT C:

SELECTED MEDIA COVERAGE

WINTER 1996

Workplace *Education Report*

GLOBAL 2000: A MODEL WORKPLACE EDUCATION PARTNERSHIP

America's manufacturing workforce will be left behind in an increasingly global economy if it is unable to achieve adequate language and literacy levels.

In 1994, The Continuing Education Institute, Inc. (CEI) developed a plan submitted for funding to the National Workplace Literacy Partnership Program of the U.S. Department of Education to ensure U.S. workers are up to the challenge.

Five manufacturing companies based in Massachusetts joined as partners with CEI to set up programs specifically geared to meeting the literacy needs of their employees. The Global 2000 project is the result of this collaboration.

The inspiration for Global 2000 is the belief that workplace literacy programs are the mechanisms for every adult American to become more literate and possess the knowledge and skills necessary to compete in an international economy by the year 2000.

The Global 2000 project provides training in the areas of English communication, reading comprehension, writing and math. In addition, an Adult Diploma Program enables employees to earn a standard high school diploma. Whenever needed, tutoring and counseling are provided. Literacy and language training are also provided for employees with limited English skills. All educational training is given at the worksite.

Criteria for participating in this three year program include:

- With the exception of the ADP Program, employees must attend classes half on their own time and half during paid release company time. This split ensures the motivation and commitment of both the student-employees and the company. The ADP Program is considered a degree program, and the student attends on his or her own time.
- Employee Involvement Teams, containing employee representatives from all levels, have been organized to direct the project internally. These individuals work together to generate site-specific needs analysis, recruit participants and conduct evaluations.
- A company official participates on an Executive Board in order to interact with the other grant partners in evaluating the progress of the project and disseminating the results.

The five companies participating in the program are American Engineered Components of Cambridge, MA; Analog Devices Inc. of Norwood, MA; Boston Scientific Corporation of Watertown, MA; Fire Control Instruments of Newton, MA; NIDEC/Power General of Canton, MA. CEI, of Needham, MA is the educational provider and administrator of the grant for the U.S. Department of Education, Division of Vocational and Adult Education.

A description of each partner follows:

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Boston Scientific Corporation

Boston Scientific Corporation produces medical devices requiring exacting specifications. The company recently instituted new manufacturing processes requiring all workers to use English language in order to communicate, read assembly operating procedures, interpret schematic diagrams of products and complete written documentation. Almost 50 percent of the workers in some departments require classes in English as a Working Language (EWL).

Boston Scientific Corporation, like all the other partner companies, is in the process of changing its manufacturing processes from employees performing one or two operations to employees working in production cells and performing one to 25 operations.

> *We significantly multiply the power of our resources by tapping into the wealth of ideas and experiences of all our employees.*
> Jean Kelly
> Training Manager
> Boston Scientific Corporation

Jean Kelly, Boston Scientific Corp. Training Manager, has this to say about the project."There is no doubt the Global 2000 Project has been very important to us! Employee involvement and participation at all levels is critical to our growth and success. We significantly multiply the power of our resources by tapping into the wealth of ideas and experiences of all our employees. In order to accomplish this, every employee must be able to communicate effectively; whether it is by participating in a continuous improvement project, developing an innovative approach to a technical issue, problem solving in a team setting or being cross-trained on a variety of jobs.

Participants are now communicating more with managers, supervisors, engineers, technicians and co-workers. Their participation in and involvement on teams has increased and one unexpected, but important, benefit has been their increased level of self-confidence."

NIDEC/Power General

NIDEC/Power General is a domestic manufacturer of high quality, high performance power conversion products and AC and brushless DC tube axial fans and motors. The company employs about 325 people of whom 186 work as electronic and electro-mechanical assembly production workers. During the past few years, NIDEC/Power General has made significant strides toward becoming a "world class manufacturer." Several work teams have been set up and employees have been encouraged to think creatively and solve problems. It is anticipated that each employee will be able to read and interpret product specification as well as to audit for quality.

> *We feel we have a responsibility to provide the education and training for our employees to succeed in this changing environment.*
> Beth Proctor
> Human Resources Manager
> NIDEC/Power General

Beth Proctor, Human Resources Manager, says, "We feel that we have a responsibility to provide the education and training for our employees to succeed in this changing environment. Fifty-eight percent (58%) of our workforce is Portuguese speaking, and another significant segment is from Asia. We have identified approximately 35 individuals who speak and/or understand limited English, a few of whom are unable to read and write. These employees need to develop competency in the basic skills of reading, writing, arithmetic, speaking and listening in the English language. We feel that this is the first step for these individuals before training can begin in problem solving skills and team interaction and communication."

The other three manufacturing companies are members of the Associated Industries of Massachusetts. The following includes excerpts from the AIM (Associated Industries of Massachusetts) Association newsletter, *Business & Industry Reporter, Volume 7, Number 3, April, 1995.* (Re-printed with the permission of Andre Meyer, Senior Vice President for Communication and Research.)

Analog Devices, Inc.

Analog Devices, Inc. designs, manufactures and markets a broad line of high-performance linear, mixed-signal and digital integrated circuits (ICs) that are used in a wide range of signal processing applications. Analog Devices' system-level ICs are used predominantly in communications and computer applications. Its core signal processing technologies are required for all of the emerging communications standards, providing the company numerous new product opportunities for ICs used in wireless,

fiberoptic, coaxial cable and twisted pair applications that will be part of the new information infrastructure.

It is at the assembled products division in Norwood that the current workplace literacy program is being implemented. Because the company had been using CEI before this recent grant, it has been able to analyze the effectiveness of CEI's programs.

> *Employees do not have to be non-native speakers to profit from the courses.*
> Gene Hornsby
> Director of Operations
> Analog Devices, Inc.

Gene Hornsby, Director of Operations, speaks highly of the program and believes that its comprehensive nature, teaching not only English as a second language, but also reading and writing and math, makes it particularly attractive.

Hornsby gave as an example the operation of statistical process control which he said involves taking data, analyzing that data, and determining how the process is running. To do all this, he said, employees need both language and math skills. Furthermore, he pointed out, employees do not have to be non-native speakers to profit from the courses.

American Engineered Components

American Engineered Components (AEC) is a designer and manufacturer of complex stamped components for a wide range of industries including automotive, appliance and electronics. It has three major stamping technologies — progressive dies, transfer presses and multislides. The company designs and builds many of its own dies.

> *AEC recently restructured its operations. Taking advantage of the Global 2000 Program enables us to train our employees who have the wisdom, attitude, loyalty and skills that you cannot count on in someone you hire off the street.*
> Thomas Courtney
> Personnel Manager
> American Engineered Components

Forty-three percent of their employees are foreign-born and need help with communication skills. According to Thomas Courtney, Personnel Manager, "The skills that are most needed today are Team Building, Problem Solving and Critical Thinking. In order to get to those skills we need to start with the basic ingredients — EWL, Reading, Writing, and Math — that the Global 2000 Program provides. Taking advantage of the Global 2000 program enables us to train our current employees who have the wisdom, attitude, loyalty and skills that you cannot count on in someone you hire off the street."

Fire Control Instruments

Fire Control Instruments develops, designs and manufactures fire alarm/life safety control systems for commercial, industrial and institutional markets.

Fire Control Instruments (FCI) had an immediate need for CEI's English as a Second Language program since 14 different native tongues are represented within its highly skilled workforce. The company has done a survey to assess its literacy needs and, working with CEI, has put together classes to address those needs.

Since CEI also develops classes in basic math skills, Fire Control Instruments may decide to include math classes later, but for now the emphasis will be on English because, as the company's Human Resources Manager, Lois Thoms, pointed out, "The employees have better skill in math than basic English."

> *With this program we can keep our commitment to our employees and ensure that our business stays healthy and competitive.*
> Lois Thoms
> Manager Human Resources
> Fire Control Instruments

Further, Lois Thoms had this to say concerning the need for a basic education program at Fire Control Instruments. "The business environment is stringently competitive. Survival dictates that we deliver a superior product and deliver it faster at a better price than our competitors. To do that we recognized all employees would need basic literacy skills to help them learn and adapt to changes in the work environment. Our choices were few, either change our employees or change our employee's skills. Global 2000 made the choice simple. With this program we can keep our commitment to our employees and ensure that our business stays healthy and competitive."

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Continuing Education Institute

CEI has more than eighteen years of experience in the field of adult education, especially education geared for the workplace, and has been the recipient of two previous National Workplace Literacy Projects as well as numerous contracts with industry. Since CEI methods have been used with outstanding success in other industries, they should have equal impact on all of those involved in this current Global 2000 Partnership.

The partnership between Continuing Education Institute, Inc. and the five manufacturing companies highlighted in these pages, is one of forty-six workplace education designs selected for implementation by the United States Department of Education. This three-year program, funded by a National Workplace Literacy Grant of $1,168,600 will serve as a model to demonstrate the effectiveness of worksite educational programs.

> *Workplace education programs are in the long run very economical because they not only provide basic skills but also increase self-confidence and feelings of empowerment.*
> Lloyd David, Ed.D.
> President/Executive Director
> CEI

The need for reliable data is vitally important to the continued growth and success of companies such as the partners in this Global 2000 project, so named, in part, to signify that by the year 2000 the participants will be prepared to compete successfully in an international environment. It is already apparent that competitive viability depends upon raising the basic skill levels of employees so that they can take on more diverse duties and communicate effectively with others. The goal of the Workplace Education Program at these companies is to increase productivity by improving the language, literacy and math skills of targeted employees.

According to Dr. Lloyd David, CEI Executive Director, "Workplace education programs are in the long run very economical because they not only provide basic skills but also increase self-confidence and feelings of empowerment. This often gets reflected in workers making greater effort and showing more loyalty."

Dr. Lloyd David, President/Executive Director
Katherine Archer, ESL Program Director
Kathryn L. Hassey, Adult Diploma Program Director

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GLOBAL 2000: A National Workplace Literacy Manufacturing Program

Five Massachusetts manufacturers have found productivity goes up when workers get up-to-speed on basic language and literacy skills. GLOBAL 2000 is a demonstration project funded by the National Workplace Literacy Program of the U.S. Department of Education. It is a partnership of five manufacturers — American Engineered Components, Analog Devices, Boston Scientific Corporation, Fire Control Instruments, and NIDEC/Power General — and an educational provider, Continuing Education Institute (CEI). The project's goal is to educate workers to make them more trainable, more flexible in terms of work assignments, and ultimately more productive.

GLOBAL 2000 offers classes in English communication, reading comprehension, business writing, and math to employees of the five eastern Massachusetts firms. Its Adult Diploma Program enables employees to earn a standard high school diploma. Students also learn to use a computer so they can practice their new skills outside of class time.

Since the program began in October 1994, more than 440 workers from the five companies have enrolled in reading, writing, English as a second language (ESL), and math classes. In June 1996, 40 participants received their high school diploma through the CEI Adult Diploma Program.

Each participating company selected a group of employees to serve on an Employee Involvement Team (EIT) along with CEI staff to determine the literacy needs of the company's workforce and consider which employees to offer educational training to. The EIT is responsible for recruiting participants, assisting in tailoring the curriculum to the company, and monitoring and evaluating participants' progress.

For example, the EIT at Fire Control Instruments (FCI) in Newton, a manufacturer of fire alarm systems, constructed a needs survey using skills that employees use on the job (speaking English clearly, relating information from meeting to co-workers, reading English documents, reading and understanding safety signs in English, converting fractions to decimals, etc.).

Each of the 20 assemblers (whose first language is Mandarin or Vietnamese) was interviewed by a member of the EIT team to determine his or her ability in each of 15 skill areas. The EIT administered the first survey in February 1995, before any instruction began. Among the findings: only ten percent of the workers spoke English clearly, only 15 percent could read English documents, and only 30 percent could understand English verbal instructions and key terms.

During the next year, employees were enrolled into one of two ESL classes, based upon level of ability. Each class met four hours a week, two hours on company time and two hours on the employee's own (unpaid) time. They participated in around 180 hours of instruction; most had perfect attendance.

The participants responded to the same survey in April 1996. Participants demonstrated significant gains in almost every skill area. For example, the number of people who could "understand verbal instructions and common key terms in English" rose from 30 percent to 75 percent. The percentage of participants who could "read English documents accurately" went from 15 percent to 50 percent, and those who could "read and follow procedures to perform job tasks in English" increased from 15 percent to 65 percent.

Supervisors and managers have reported that employees are showing more confidence in their ability to read and understand work instructions in English. The company no longer needs to use interpreters during meetings. Also, employees are more willing to ask questions and to request clarification when they do not understand.

Participants who assemble circuit boards also demonstrated significant productivity improvement. The company's major goals were to achieve a weekly acceptance rate of at least 95 percent first yields and to reduce rework and save scrap. During the first 15 weeks of 1995, before the start of English classes, assemblers reached the target acceptance rate only two weeks amidst unexplainable fluctuation from week to week, which meant a great deal of rework. A year later, after 180 hours of instruction, the 95 percent target for board acceptance was achieved every week. During that year there were no significant changes in products, processes, equipment, or materials introduced to this group so the company could only attribute the change to the ESL classes.

The GLOBAL 2000 project shows that raising employees' educational level is one of the best ways to improve productivity. Reports from both supervisors and employees attest that investing in workers' basic education benefits the entire organization.

By Lloyd David, Ed.D., president/executive director, Continuing Education Institute, Inc., Watertown, MA: 617/926-1864 or 800/390-0899.

Originally published in **Target** magazine, the periodical of the Association for Manufacturing Excellence, June/July/August 1997, titled *Global 2000: A National Workplace Literacy Manufacturing Program.*

VOLUME 7 NUMBER 3 APRIL 1995

Business & Industry REPORTER

At a Workplace Communication Skills cla... at American Engineered Components in Cambridge, Alison Barnet (left), CEI instructor, reviews the work of employee Alex Vyardo as another employee, Inez A. Andrinho, looks on and two other employees (far right), Gloria Gonzalez and Hilda A... las, concentrate on their assignments.

It was back in the summer of 1993 when the *Business & Industry Reporter* ran an item in the Bulletin Board section which announced that the Continuing Education Institute (CEI) in Needham was seeking partners for a National Workplace Literacy Program sponsored by the U. S. Department of Education. A.I.M. companies interested in the program were urged to get in touch with Dr. Lloyd David at the Institute. One A.I.M. company, Fire Control Instruments, Newton, did just that and became one of the five Massachusetts companies selected to receive the $1.1 million federal grant to improve workplace literacy.

Two other companies selected were A.I.M. members also. American Engineered Components (AEC) in Cambridge learned about the program through A.I.M.'s senior vice president for communication and research, Andre Mayer, who had alerted A.I.M. director, Kathleen Schoonmaker, AEC's vice president of operations.

Another A.I.M. company, Analog Devices/Assembled Products Division, Norwood, which was also included in the grant, had already been using CEI to develop literacy programs at the time CEI applied for the grant. The three-year grant is being administered by the Continuing Education Institute, which helps the companies set up programs tailored to their specific needs.

FIRE CONTROL INSTRUMENTS

Fire Control Instruments

Fire Control Instruments (FCI) has an immediate need for CEI's English as a Second Language program since 14 different native tongues are represented within its highly skilled workforce. The company has done a survey to assess its literacy needs and, working with CEI, has put together classes to address those needs.

CEI also develops classes on basic math skills, and Fire Control Instruments may decide to include math classes later, but for now emphasis will be on English because, as the company's human resources manager, Lois Thoms pointed out, "the employees have better skill in math than basic English."

FCI's products and markets

Fire Control Instruments develops, designs and manufactures fire alarm/life safety control systems for the commercial, industrial and institutional markets. These products run from the two-zone or four-zone alarms to FCI's top-of-the-line microprocessor-controlled, intelligent systems. All have networking, expansion and upgrade capabilities engineered in, which enables them to grow right along with the customers' expanding operations. FCI also does contract manufacturing, providing client corporations with finished printed circuit boards.

The company sells its products through a national and international network of certified fire alarm distributors. It has approximately 120 domestic (US) distributors and 35 international distributors with the international market its fastest growing sector.

AEC
American Engineered Components, Inc.

American Engineered Components

Forty-three percent of the employees at American Engineered Components are foreign born. They, like the employees at Fire Control Instruments, need help with English.

The need became especially acute when AEC restructured its operations into self-directed work teams. Where once there had been five people thinking about and organizing the work and 100 people just running machines, now there are 100 people thinking about the work and how to do it better.

Because the employees in these self-directed work teams are now responsible for planning their own work and are meeting with customers and vendors, they need better language skills. Realizing this need in its employees, the company, partnered with CEI, formed a team of employees (one supervisor, two hourly employees, and the personnel manager) to assess the specific needs required. It was determined that two courses would be taught: "English as a Working Language" and "Reading and Writing." CEI started teaching the first session of each course in March. Both courses are being held during work time.

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A.I.M. COMPANIES

ON THE POSITIVE SIDE

Three A.I.M. companies share in a $1.1 million federal grant to improve workplace literacy

Attending an English as a Second Language class, employees at Fire Control Instruments, Newton, are working hard to improve their language skills.

"Fortunately the world is changing to recognize that each of us can direct our own workflow if we are given the skills and information required to make good decisions. The better trained each of us becomes, the more flexible the organization can be."

Kathleen Schoonmaker
Vice President of Operations
American Engineered Components

The employees are delighted that the company has provided them with the opportunity to improve their language skills. In fact, Schoonmaker said that when the company had first announced that there would be language courses, the employees were constantly stopping her in the corridor and asking, "When is school going to start?"

Profile and products of AEC

American Engineered Components is a designer and manufacturer of complex stamped components for a wide range of industries including automotive, appliance and electronics. It has three major stamping technologies — progressive dies, transfer presses, and multislides. The company designs and builds its own dies.

The progressive die process is one in which parts are outlined and formed while connected in a strip and are blanked free in the final station. Because of its faster machine speed and shorter set-up time, it is almost always used when a product design calls for a cost efficient, simplified stamping process. At AEC it is most commonly used to produce teenuts, electronic components, and sealer plugs.

The transfer press process is used to manufacture cupped or drawn components. In this process, material is blanked from the strip in the first station, and the blanks are then transferred between stations by a transfer slide mechanism. Each station functions independently, performing operations such as cupping, drawing, piercing and outlining. The company generally uses the transfer technology to manufacture plug buttons, drawn shells, and shell enclosures.

In the multislide stamping process, parts are connected in a strip and are initially subject to piercing, drawing, shearing, and simple forming. Next, the parts are blanked free, and a series of cams and arbors complete the complex bending and folding. This process provides component designers with extensive flexibility of design.

Roots

Although American Engineered Products acquired its present name in August of 1992 when the TRW Fasteners Division sold its Carr Metal product lines, AEC can trace its origins to 1912 when Fred S. Carr founded the Carr Fastener Company in Cambridge. A carriage maker by trade, he developed a concept for making fasteners that attached canvas to his carriages. Known as "Dot" fasteners, these early components were widely used for both horse-drawn and horseless carriages.

In 1929 the Carr Fastener Company merged with a competitor to become United-Carr, and shortly thereafter the success of United-Carr was assured when the company developed a teenut for Fisher Body. This simple component enabled sheet metal to be effectively fastened to the newly fabricated metal frames that were beginning to replace wood throughout the automotive industry. Today, AEC says it is proud to carry on the tradition of creative engineering solutions that has always been the hallmark of the company.

ANALOG DEVICES

Analog Devices

Analog Devices has plants at two locations in Massachusetts, one in Wilmington and one in Norwood. It is at the Assembled Products Division in Norwood that the current workplace literacy program is being implemented. Because the company had been using CEI before this recent grant, it has been able to analyze the effectiveness of CEI's programs.

Gene Hornsby, director of operations, speaks highly of the program and believes that its comprehensive nature, teaching not only English as a second language, but also reading and writing and math, makes it particularly attractive.

Hornsby gave as an example the operation of statistical process control which he said involves taking data, analyzing that data, and determining how the process is running. To do all this, he said, employees need both language and math skills. Furthermore, he pointed out, employees do not have to be non-native speakers to profit from the courses.

A catalog of Analog Devices

Analog Devices, Inc. designs, manufactures and markets a broad line of high-performance linear, mixed-signal and digital integrated circuits (ICs) that are used in a wide range of signal processing applications. The company's principal products include system-level ICs and general purpose, standard product linear ICs. ICs represent 90 percent of total revenues.

Analog's system-level ICs are used predominantly in communications and computer applications. Its core signal processing technologies are required for all of the emerging communications standards, providing the company numerous new product opportunities for ICs used in wireless, fiberoptic, coaxial cable and twisted pair applications that will be part of the new information infrastructure.

Analog's computer applications include ICs and chip sets used in multimedia applications for business and entertainment audio and fax/modem functions.

Most of the company's general-purpose, standard product revenues come from high-performance amplifiers and data converters, historically sold into the industrial market but now being used in higher volume computer, communication, automotive and consumer applications.

Begun in 1965 when it was co-founded by Chairman Ray Stata in Cambridge, Analog Devices moved to Canton in 1967. Now headquartered in Norwood, Analog Devices has manufacturing facilities in Massachusetts, California, North Carolina, Ireland, Japan, the Philippines and Taiwan; and it has direct sales offices in 17 countries including the United States.

Continuing Education Institute

The organization that these companies partnered with and that applied for the government grant on their behalf is the Continuing Education Institute (CEI). The Institute was established in 1977 as a nonprofit organization developing innovative education programs for adults who lacked basic academic or English language skills. At present, support for its programs is provided by grants from federal and state agencies and by fees from corporations.

In the case of the three A.I.M. companies, the grant money is paying for the development of custom courses and teaching by CEI and so there are no fees. However, the companies are providing classroom space and management personnel whose time will be used to coordinate programs. The companies are also allowing employees time to take the courses which can be all work time or half work time and half employees' free time.

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THE NEW ON-THE-JOB training

WORKING FAMILY SORORITY: Olivia Ramos, left, Connie Gonsalves, center, and Fatima Viveiros are three sisters from Stoughton who took advantage of Analog Devices' adult education program to improve their English language skills and earn high school diplomas from Don Bosco High School.

COMPANIES, EMPLOYEES BENEFIT FROM LITERACY IN THE WORKPLACE

Connie Gonsalves began working for Analog Devices when it had only a handful of workers assembling circuit boards in a basement workshop.

Back in 1969, it mattered little that Gonsalves spoke mostly Portuguese. The few words of English she needed to know, co-workers taught her as they sat side by side on the assembly line.

When Gonsalves was promoted to group leader, er Portuguese language skills were an asset. Most f the 16 assemblers she supervised in 1973 spoke ortuguese, too.

"If you could follow the blueprint, and you could llow instructions, it was good enough," Gonsalves aid. "I only had to speak English to the upervisors."

Those days are gone. At Analog Devices and lsewhere, manufacturers expect more of their hourly employees than strong backs or the ability to endure the brain-numbing repetition of assembly work.

As manufacturers introduce new equipment to the factory floor, adopt new approaches to quality control or strive for international certification, they need a sophisticated labor force capable of learning new ways to work.

What many firms discover is that their work force is ill-prepared for change. Some manufacturers find they need to move beyond traditional on-the-job training into remedial education.

The challenges for companies that offer such programs are numerous.

Some workers, like Gonsalves, are not native English-speakers. While skilled at their jobs, they have relied on co-workers to act as interpreters —

Please see TRAINING — Page 30

Dr. Gabriel R. Cipau, Copley Pharmaceutical's chief executive, says the company knew it needed to educate its workers before it could rely on them to use sophisticated statistical methods to measure day-to-day output. For workers, he says, "This requires a different level of skill than you had before."

Story by
Dawn Chmielewski
The Patriot Ledger

Patriot Ledger photos by

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BOSTON HERALD

Mass. firms get grant

Five Massachusetts manufacturers, in partnership with the Continuing Education Institute of Needham, have landed a $1.1 million federal grant to improve workplace literacy.

The U.S. Department of Education awarded the three-year grant, part of the National Workplace Literacy Program, to American Engineered Components of Cambridge; Analog Devices/Assembled Products Divison in Norwood; Boston Scientific in Watertown; Fire Control Instruments in Newton; and Power General/NIDEC in Canton.

"The purpose of the grant is to improve basic educational skills in the work force to help these companies become more competitive," said Dr. Lloyd David, CEI's executive director.

"Literacy is a major hurdle for manufacturing companies like ours that have a large percentage of foreign workers," said Kathleen Schoonmaker, vice president of operations for American Engineered Components.

In addition to the federal grant, partners in the project have also committed over $580,000 in company time and resources.

II. Ten Case Studies: *Global 2000 participating companies*

Katherine Archer
Global 2000 Coordinator

Global 2000

National Workplace Literacy Partnership

American Engineered Components
Project Report
October, 1994 - July, 1996

The Company - Year 1

American Engineered Components (AEC) in Cambridge, Massachusetts was formed after the TRW Fasteners Division sold its Carr Metal product lines to AEC in 1992. TRW leased the facilities to the new company. AEC designs and manufacturers complex stamped components for automotive, appliance and electronics industries. AEC utilizes three major stamping technologies – progressive dies, transfer presses and multislides, designing and building its own dies. As most products are designed and built to the customers' specifications, manufacturing a quality product in a timely fashion is of prime importance.

The management of AEC were former TRW employees, and many of the workers laid off from TRW were hired by AEC, which employs a total of 130 exempt and non-exempt workers with an average of 24 years with TRW and AEC. Over 40% of AEC's employees are foreign born.

The Production VP headed up the company's participation in the *Global 2000* project and was a strong advocate for workplace literacy in the company. The VP, along with an engineer and the Personnel Manager identified AEC's goals for participating in the project to be the following:

1. Improve product quality and productivity - all employees must have the ability to read instruction sheets, lot travelers, operation and set up

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instructions; communicate effectively in teams and meetings with customers and suppliers; make suggestions for improved processes.

2. Improve safety - employees will have the ability to read MSD sheets, labels and safety procedures.
3. Full participation in company information - ability to read company newspaper, notices and memos and to understand presentations at 'all hands' meetings.
4. Employees in self-directed work teams - ability to write minutes of meetings, prepare written presentation and document the changes in work processes.

Employee Involvement Team

The VP of Production and the Personnel Manager selected the employees to be invited to participate in the AEC Employee Involvement Team (EIT). The criteria they used to identify potential team members were that they were vocal leaders, were perceived by others as leaders, and were concerned with quality. In addition to the VP, who served as the team leader, and the Personnel Manager, the team consisted of a supervisor, a group leader and a production worker, all of whom were non-native American English speakers.

The team reviewed the goals for the project and expanded on how each played out in the current company culture. For example, team members thought workers needed to exhibit greater pride and care in the their workmanship - some of the workers did not pay attention until production was out of tolerance range or the machinery broke down. Communication within the company was difficult due to the sprawling nature of the plant, which isolated departments from one floor to the next. The effect of the distances meant that coordination between design and production was often haphazard. Lack of English language and literacy also isolated groups of workers from each other. The largest non-English speaking group was the Portuguese who relied on translators to communicate within the company.

The Employee Involvement Team decided to focus on English as a Second Language (ESL) instruction as the most needed educational element in its *Global 2000* project. However, conducting an Educational Needs Survey of production

workers would give the team a broader perspective of the company's educational needs, so they developed a survey to address overall needs. (See: Survey Attached) The strategy for conducting the survey was to send workers in groups to the cafeteria to complete the survey and return it to team members on the spot. All the surveys were then tallied and scrutinized by the VP for discrepancies between the worker's self-assessment and the management's assessment. Approximately 30 employees were identified as needing pre-literate and beginning ESL instruction. These employees were interviewed by CEI staff and tentatively placed in two ESL classes.

During the interview process, several employees indicated that they would not or could not participate in a class so they were dropped off the roster. The VP had decided to make educational training mandatory, i.e. all instruction was offered on company time, and, therefore, these employees were required to re-enroll. CEI staff advised against enrolling unwilling participants, and the VP agreed. However, the VP then created a Reading/Writing class, moving some ESL participants as well as new recruits into the class without consulting the team. 12 employees were enrolled into the Reading/Writing class and 14 employees into a basic ESL class. 17 weeks of instruction began in March, 1995.

Curriculum Development

The Employee Involvement Team provided examples of documents AEC workers needed to be able to comprehend in English including the company newsletter, lot travelers, safety information and bulletin board memos. CEI staff adapted some of the documents for classroom instruction including using selected vocabulary in conversation and grammar exercises, finding details through scanning documents and asking learners to describe their jobs in increasing detail.

As the ESL participants had minimum literacy skills in English, the major curriculum focus was on pronunciation, speaking and listening skills. Participants made maps of the plant, identifying and labeling production areas. Part of the mapping process involved asking questions in English of co-workers about their work areas. For a final project, participants assembled detailed charts describing all aspects of their jobs. Many projects were quite ambitious, devising colored charts, drawing cartoons and adhering actual parts to a sturdy backing.

Curriculum development in the Reading/Writing class focused on developing those skills for improving comprehension and writing. Participants worked on giving directions, on scanning, identifying main topics and supporting details, developing vocabulary in context and building speed in reading. The writing topics developed from the reading emphasized outlining summaries, using new vocabulary and distinguishing fact from opinion. The final project was dictated by the VP: descriptions of each participant's job.

Outcomes

13 participants completed the ESL class, 12 participants completed the Reading/Writing, and all received certificates during a ceremony attended by supervisors and management personnel and the EIT. Several participants explained their enthusiasm at, as one put it, "my first certificate and diploma for anything ever!" The final projects were displayed, and participants were on hand to talk about their work. EIT members did not want any special recognition for their service on the team, saying that "sitting down" time had been sufficient. The team had met 7 times during year 1 of the project.

Members of the EIT conducted interviews of participants about the class they had attended. The ESL participants were enthusiastic about their progress in learning English and were eager for more instruction. Members of the Reading/Writing class gave mixed reviews, mainly because they had been drafted into a class they either weren't interested in, or didn't have the literacy skills for, or because they had been expecting to take an ESL class instead. Curiously, many thought being asked to write job descriptions was the company spying on how they spent their time.

The Personnel Manager noted that many ESL participants had, for the first time, come to his office to ask about vacation time or financial matters without a translator.

The Company - Year 2

The Production VP left the company in August 1995. The VP for Finance was recruited for the project. AEC could not renew their lease with TRW for the

plant, so a committee was formed to find another location. Finding space for a forge and heavy machinery proved daunting. Employees were in a state of constant anxiety about a new commute and their continued employment.

The company decided to continue the ESL class but only if employees were willing to attend on a half company-time basis: most opted to continue.

Employee Involvement Team

The AEC Employee Involvement Team recruited employee/participants for the ESL class and the CEI Adult Diploma Program. Members targeted employees they identified as candidates for both programs and talked to them individually. A continuation of the ESL class was organized with 9 employee/participants returning. The one class began in October 1995 and was held in the afternoon to accommodate ending or beginning shifts.

CEI staff conducted an informal information session for 4 employees interested in participating in the *Global 2000* project's CEI Adult Diploma Program. One employee ultimately made the commitment to the 10-month program and attended classes at another partner-company site and graduated in June, 1996.

CEI staff asked members of the EIT to answer questions about their experiences on the team for evaluation purposes. None responded to the questionnaire in writing but in a discussion about their experiences, they described their service on the team as rewarding. Members took credit for organizing the classes and expressed pride in having noticeably changed co-workers lives. Members thought that more frequent team meetings would be helpful for providing greater consistency in their activities. Due to the search for new facilities and a downturn in business orders, there were even fewer meetings. The company had shifted its focus to concerns for the future. In year 2 of the project the team met 5 times, two of those times informally for feedback about the ESL class.

CEI staff met with the Finance VP to pursue ways to measure the relationship between educational training and productivity. A plan was developed for the supervisor with the largest group of employee/participants to keep a log of observable changes in work-related activities. This log produced only one entry

Outcomes

AEC decided to withdraw from participation in the *Global 2000* project due to their imminent move and business concerns. The ESL class concluded in June 1996, with all 9 participants completing the class. The company opted not to have a concluding ceremony.

EVALUATION
FOLLOW UP INTERVIEWS

In 1998 the CEI Executive Director visited most of the partner companies to interview former students and managers concerning their experiences with the program. At AEC he met with Director of Personnel who was a member of the EIT. Each interview was recorded and then transcribed. Below is a representative quote:

Director of Personnel – "Most of the Portuguese people that took the English as a Second Language class seemed to gain a lot of confidence. I noticed myself that some of these women assemblers wouldn't come into the personnel office by themselves, they always had to have somebody who was a good English-speaking Portuguese person come with them. But I noticed after they had completed those courses even to this day they'll come in by themselves. So I think they got a little confidence."

AMERICAN ENGINEERED COMPONENTS

ATTACHMENTS:

- *Course Enrollment Statistics*
- *Employee Education Needs Survey*

American Engineering Inc.

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ADP*

Course Title	*Number Enrolled*
BSC Life Emp Wkshop 1	1
BSC Reading/Writing 1	1
BSC Math/Science 1	1
BSC Math/Science 2	1
BSC Rdg/Wtg/History 2	1
BSC Life Emp Wkshop 2	1

Summary for 'Type' = ADP (6 detail records)

Sum *6*

Type *ESL*

Course Title	*Number Enrolled*
AEC Read/Writing Skills01	12
AEC BasicLangSkills 01	14
AEC Basic Lang Skills 02	10
AEC Basic Lang Skills 03	9

Summary for 'Type' = ESL (4 detail records)

Sum *45*

Summary for 'Program/Contract' = Global 2000 (10 detail records)

Sum *51*

Summary for 'Company' = American Engineering Inc. (10 detail records)

Sum *51*

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Global 2000: A National Workplace Literacy Manufacturing Program
at
American Engineered Components

Name _____Department_____Date_____

Employee Education Needs Survey

I. Please circle the number which best describes your ability to perform the following activities at work:

	Perfectly----------			----------Poorly
1. Speaks English clearly one-on-one	3	2	1	0
2. Speaks English clearly in a group	3	2	1	0
3. Shows confidence speaking English	3	2	1	0
4. Understands verbal instructions one-on-one	3	2	1	0
5. Understands instructions in production meetings	3	2	1	0
6. Relates information from meetings to co-workers	3	2	1	0

II. Please check the word which best describes your ability to read the following information in English:

I can read and understand:	Easily	With Difficulty	Unable
• bulletin board announcements	☐	☐	☐
• company newsletter	☐	☐	☐
• personnel forms (insurance, 401K, etc)	☐	☐	☐
• lot travelors	☐	☐	☐
• SPC instructions	☐	☐	☐
• safety signs on machines	☐	☐	☐
• inspection instruction sheet	☐	☐	☐
• individual Employee Review form	☐	☐	☐

III. Please check the description which best describes your ability to perform the following math calculations:

	Easily	With Difficulty	Unable
I can convert:			
• quantities into cartons	☐	☐	☐
• pieces into pounds	☐	☐	☐
• pounds required to produce pieces	☐	☐	☐
• tolerances into the specification range	☐	☐	☐
• fractions into decimals	☐	☐	☐

Employee Interest Survey

IV. When classes are held at American Engineered Components, check which subjects would be the most useful to you:

	Yes	No	Maybe
English as a Second Language	☐	☐	☐
Reading	☐	☐	☐
Math	☐	☐	☐
Adult Diploma Program	☐	☐	☐

I have completed _____years of school in _____(my country).

Global 2000

National Workplace Literacy Partnership

Analog Devices, Inc.

Project Report

1994 - 1997

The Company

Analog Devices, Inc. (ADI) is a Fortune 500 company with 5300 employees worldwide and manufacturing facilities in Massachusetts, California, North Carolina, Ireland, Japan, the Philippines and Taiwan. Analog Devices designs, manufactures and markets precision high performance components used in analog and signal processing applications.

The partner in the *Global 2000* project was the ADI Norwood, Massachusetts manufacturing facility employing 160 people. Two-thirds of the workforce were non-native English speakers, primarily female and from Portugal. Most of the Portuguese speaking employees had 15 - 25 years of service exclusively at ADI.

The Norwood plant manufactured modular components (voltage to frequency converters, digital to analog converters, operational amplifiers, etc.) and a line of analog input/output devices providing the electrical link between factory or laboratory equipment and the computers used to control the equipment. The work requires dexterity and precision in manipulating small electronic components and, in some operations, potentially hazardous materials.

The company's goals in participating in the *Global 2000* project were to improve productivity, process control and increase employee empowerment in preparation for ISO certification in 1996. The company also strove to improve the communication skills of its predominantly non-English speaking workforce in order for them to

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understand customer requirements and corporate information and to develop a greater cohesion among the workers. It was thought that production workers volunteering for English as a Second Language instruction would be a step towards meeting the latter company goal.

Employee Involvement Team 1994 - 1995

The preliminary contacts with Analog Devices were with the Production Manager. In selecting members for the Employee Involvement Team (EIT), CEI staff and the Production Manager described the project to members of a Technical Writing class made up of Group Leaders and Technicians and asked for volunteers from that group. The EIT was formed of 3 Group Leaders from the Technical Writing class, 1 Supervisor, 1 Technician and 2 production workers. The Production Manager served as the team's facilitator until he was promoted to another position at a different facility. With his departure, the Supervisor along with CEI staff became the facilitator. The team met weekly in November and December of 1994 to plan the project.

Initially, the team thought about what educational training they would offer and to whom. The largest group of employees was the Portuguese production workers but getting them to participate in English as a Second Language (ESL) classes did not happen easily. The production floor was organized into two main areas each directed by an English-speaking, male supervisor. Within each area, group leaders who were bi-lingual in English and Portuguese directed particular tasks. All instructions were translated into Portuguese and conversation flowed in Portuguese as well; there appeared little urgency or opportunity for workers to use English. However, the company had as one of its goals to seek ISO certification and to prepare for the audit process would require everyone's participation in English. Creating successful recruitment strategies would occupy the team throughout the project.

The first step towards recruitment of Portuguese workers for ESL classes was to draft a Needs Assessment survey of workers' educational needs for English classes to be completed by the Group Leaders. The second step was for CEI staff to meet with each Group Leader and discuss his/her assessments in greater detail. These discussions enabled CEI staff to become acquainted with the Group Leaders and begin the process of eliciting their support in the project. (See: Needs Assessment Attachment) Meanwhile the company management was requesting that all group leaders promote the use of English in their groups by giving all instructions only in English. This was a directive the Group Leaders found difficult to adhere to while simultaneously getting the work done in a timely fashion. A subsequent meeting of the EIT and all the Group Leaders clarified the language-based issues further in that many Group Leaders were

not eager to promote learning during working hours since they had struggled on their own to learn English. Also, some Group Leaders realized that English speaking workers would alter their unique position in the company. The EIT now knew they would have to gain the support of the Group Leaders as well as try to recruit participants for the ESL classes.

The EIT decided that tackling workers and group leaders head on about increasing the English usage in the company was beyond their scope. Instead they took a more personal approach. Each team member talked to co-workers individually about the benefits of learning English. In some instances, the team's personal efforts took two years before succeeding, and in a few cases, the co-workers remained steadfast against participating in the classes. This one-on-one approach to recruitment became the method used throughout the project.

Team members themselves became increasingly involved in finding ways to promote the use of English on the production floor. To emphasize a commitment to changing the language dynamics at work, one of the EIT/Group Leaders decided to speak to his workers only in English, while an English speaking Group Leader set aside time every morning for his workers to read the procedure and company bulletins to him out loud in English. He quizzed individuals about the meaning of words and expected them to remember new words.

The EIT's personal approach was successful in recruiting employee/participants for two ESL classes which began in February, 1995. One class of Beginning ESL had 13 participants; the other a High Beginning group had 15 enrolled. The classes were scheduled two days per week from 2 – 4 PM which gave participants one hour on company time and the final hour on their own time.

An important function of the EIT was to monitor the activities in the project --in this instance the classes. So the EIT developed a script for interviewing participants, and then divided all the participants among the team members for the purposes of conducting evaluative interviews. By and large, participants liked the classes but were disgruntled about the change in their 3 PM leaving work routine since the class time, 2 -4 PM added time to their day at the end. The team went to the production supervisors to see if a different arrangement in scheduling could be made. When the second session of classes began in the fall, 1995, class time was 1 - 3 PM, and each participant came to work an hour earlier or stayed the extra hour to make up his/her time commitment. The new schedule held for the duration of the project.

During the summer of 1995, the EIT and the employee/participants took a break. CEI staff and the supervisor/team facilitator, however, used the time to work with an ADI

Training Specialist to improve the seemingly sluggish morale of the team. The team was productive, members came to all the meetings and carried out team projects: the team meetings were labored and tedious to sit through. The Training Specialist (TS) was amazed that the EIT had been functioning without a charter, trained team leader, facilitator, sponsor or ground rules. With guidance, those elements could be incorporated into the team. CEI's concern lay rather in the member's attitude about participating at all. With the TS's assistance, we drafted a script to use in asking each team member their feelings and expectations about participating on the team. CEI staff then interviewed members individually. Contrary to appearances, members were thrilled and honored to be a part of this EIT. One member even stated that, "participating on the team was the most important thing I do at work." Members were also asked about serving as the team's leader or about supporting someone else in the role. Most chose not to serve as the leader but would support whomever wanted to do so. One member agreed to serve, and he and the supervisor then attended a 3-day training off-site in team leadership skills.

When the EIT convened in the fall, 1995, its main tasks were to develop a charter, including a team name, and ground rules: the name, *Mind Benders*, became official. The VP for Operations accepted the responsibility of sponsoring the team. Team members also spent time recruiting for the fall classes and enrolled 14 employees into the Beginning ESL, 8 continuing and 6 new participants, and 13 employees into the High Beginning ESL, 11 continuing and 2 new participants. Classes began in October.

Meetings were once again held weekly through 1995 for a total of 34 meetings in the project in 1994 and 95.

Curriculum Development

The challenge in developing curriculum for the ADI group of learners was to make the lessons non-threatening while at the same time useful at work and in the community. In order for learners to gain mastery over their ability to discriminate between sounds and to improve their own speech pronunciation, an important piece of instruction in each class was to focus on internal vowel sounds in English. Recipes and cooking were used to introduce process literacy, i.e., the ingredients/parts needed, the utensils/equipment required and the formatting of a process proved similar to many work situations. Survival skills in English such as might be needed to talk on the phone or make appointments, or to comprehend information sent through the mail were also included in the curriculum.

As ESL classes geared up again in the fall, 1995, lessons were built upon the skills developed in the initial classes. Process literacy instruction incorporated work descriptions and other examples in place of recipes. CEI staff accompanied participants to the production floor and each employee explained the steps and tools required for her job. Some participants built through-hole boards, others tested completed boards and others "potted" components for shipping. Due to CEI's experience with the EIT, the classes included team participation-type skills such as brainstorming, summarizing and giving presentations. Throughout the project, all instruction stressed pronunciation and reading comprehension skills.

Outcomes: 1994 - 1995

At the conclusion of the ESL classes in June and in December 1995, participants gave individual presentations to their class and guests from the Employee Involvement Team and management. Several participants made impressions on the management who were seeing for the first time employees as distinct individuals. Most employee/participants had gone to great lengths to be invisible to the management, so having to speak up during a ceremony was both a traumatic and confidence-building experience. Several participants had enough confidence to bid for new jobs, and their visibility at the ceremony added to management's awarding them the jobs.

CEI Adult Diploma Program

In preparation for the Adult Diploma Program (ADP), CEI offered a 12-week Reading/Writing class during the summer for interested employees. Because many potential participants in the ADP had not been in a school situation since they were children, confidence in learning created a barrier. The Reading/Writing class was designed to increase reading comprehension and to boost participants' confidence. The class was sponsored by ADI outside of the *Global 2000* project.

Afterwards 6 ADI employee/participants from the Reading/Writing class were successfully assessed in reading, writing and math prior to admittance to the ADP. These 6 participants traveled to an adjacent community for 230 hours of classes, joining with employees from another *Global 2000* partner-company. The classes were held at SHARE New England, a Catholic organization that distributes food to shelters and food pantries for hungry, located next door to Power General.

During the year they attended classes three times a week on their own time after working hours. Each class met for 2.5 hours. The student studied English, Math, Science, US History and a special program unique to the CEI Adult Diploma Program

called Life Employment Workshop. The latter is designed to allow each person to analyze skills and knowledge gained principally from their jobs, look at particular interests, and ultimately develop a career plan that includes further education. Each class focuses on reading comprehension, writing reports, research, critical thinking and oral presentations. Upon completion of all work, a portfolio was produced which was reviewed by the CEI Executive Director and the Principal of Don Bosco Technical High School. The six students from ADI graduated in June 1996 at a ceremony held at the University of Massachusetts in Boston. Subsequently ADI paid the tuition for 8 additional employees in the Adult Diploma Program who graduated in 1997.

Continuing: 1996

Analog Devices Inc. began preparing to gain ISO certification during the year. ADI's long-time workforce had become accustomed to production processes which did not necessarily conform to the accompanying documents, or, in some instances, where documentation did not exist. One of the challenges the company faced was in gaining the production workers' cooperation in scrutinizing the documents they were using and calling attention to any discrepancies they found. Meeting the challenge seemed straightforward enough: ask employees to help. Employees were willing to help but reluctant to call anyone's attention to himself or herself.

While participation in an ESL class could not change company culture, the **Curriculum Development** did address numerous aspects of the issue. For example, participants practiced scanning all kinds of documents—scanning for information, for missing items and for items out of sequence. Participants learned to identify discrepancies in a variety of contexts and to discuss them. Participants continued to describe their jobs in greater detail and to put their job functions into sequential formats. The classes also tried to expand the use of English beyond the classroom to the production floor. Participants were given vocabulary from procedures and instructed to ask several co-workers and group leaders for definitions and usage. Participants were also asked to look beyond their own job descriptions and to investigate the flow of the product they worked on.

The **Employee Involvement Team** began looking for ways to expand the use of English on the production floor and devised a *Word of the Week* contest, posting a banner with the word that could be seen throughout the production area. Team members also took turns mounting a bulletin board showing photos and written

commentary about the classes. An article about ADI's participation in the *Global 2000* project and the EIT appeared in the company newsletter.

The EIT continually wrestled with ways it might evaluate the effect of English instruction on company productivity. These discussions usually concluded in frustration with the complexity of the problem of evaluation rather than with strategies. CEI staff suggested that the team might put together an assessment packet of workplace vocabulary, policies and procedures. Each participant would be assessed by CEI staff at the beginning of the fall term and again using the same materials at the end of the classes in June 1997. The completed assessment packet also contained sample defective products and time sheets to track individual productivity. Each assessment took 30 - 45 minutes initially and again at the conclusion of the classes. The results can be noted in the attached chart. (See Assessment Attachment)

Early in 1996, the ADI sponsor instructed the EIT to prepare a presentation about the *Global 2000* project for the company's upcoming quarterly meeting. Team members were terrified by the prospect of speaking before the entire workforce; the sponsor could not be dissuaded. The team decided to do a presentation using slides to demonstrate a script. Members took on various tasks –taking photos, writing a script, lining up the equipment, choosing photos, etc. The team practiced the presentation for weeks, coaching each other. The *Mind Benders* show was a great success and gave the team members a boost in their confidence as well.

The EIT continued to try to persuade employees, especially those who spoke no English, to join the classes. The now Intermediate class had 13 employees from the previous class and 3 new participants enroll. The Beginning class had 7 continuing participants and 5 new ones. The level of the Beginning class remained low because its participants, in general, needed a lot of review and repetition of basic skills. Those individuals who progressed beyond needing basic support were encouraged to move to the higher level class. Several did so successfully.

Membership on the EIT changed in 1996. The team leader was promoted to a new job in a different facility, so a new leader was recruited from the team. The Technician was replaced by a Group Leader and one of the production workers by another from that work area. The new group looked around for projects for itself to help expand the use of English on the floor and decided on providing entertaining training videos for employees during the lunch time. Members previewed videos and made arrangements to schedule them. To assist those employees in the classes, the team leader showed sections of each video and talked about the films in class prior to the lunch time viewing.

The main **Outcome** in 1996 was the successful audit of the company for its ISO 9000 certification. The 6 participants in the CEI Adult Diploma Program earned their high school diplomas and graduated in June. In a ceremony marking the end of the year's ESL classes, also in June, participants prepared questions about the company's history, vision and activities to ask of the management.

During the summer of 1996, the EIT put together a list of potential candidates for the next CEI Adult Diploma Program. CEI staff then interviewed these individuals with limited success. Most insisted they were not good enough students to succeed in a high school program. However, the EIT sponsor was enthusiastic about the CEI ADP and, in talking to the same employees, persuaded many more to change their minds and enroll. The classes were held on-site after working hours. 8 employees participated. They graduated from Don Bosco Technical High School in June, 1997.

In the fall, 9 continuing Beginning ESL participants were enrolled, and 13 participants enrolled into the Intermediate class. Instruction in both classes focused on improving participant's speaking, listening, reading comprehension and writing skills. Projects were developed to encourage participants to gain more experience with using English at work and in their community in such activities as using the telephone, leaving messages, getting library cards and taking out books. Many participants began to ask their group leaders to speak with them in English, so they could have more practice. At the end of the year, the founder and CEO of ADI came to the plant to meet with the management and with the workers, many of whom he had worked with in the early days of the company. Student representatives were asked to speak about their experiences learning English and did so during an event for the CEO. The CEO was very supportive of all the participants' efforts.

Concluding 1997

As classes in the *Global 2000* project were coming to an end in May, 1997, the **Employee Involvement Team** discussed the possibilities of recommending that the company continue the classes as well as exploring what other groups of employees might need educational training and what that might be. The team continued its lunch time video project and turned its attention to thinking about how to evaluate the project. All of these discussions came to an abrupt end when the company announced that the Norwood ADI would be closing by the summer, 1997.

Employees were stunned. The news of the closing was like notice of death and divorce in the ADI family. ADI had been 'home' for its Portuguese employees: most

had never worked anywhere else. Participants in the classes were totally devastated. Instructors found themselves in counseling roles assisting participants through grief, anger and stupefaction. The focus of instruction, when possible, moved into investigating job skills and potential career/jobs. Instructors also needed to be cognizant of what information the company was giving out so as to be able to simplify it for participants in contrast to the company atmosphere, which was rife with rumors. Participants learned how to assemble a resume, a cover letter and how to interview. They also learned strategies for decision-making.

In May, CEI staff conducted post-workplace assessments of the participants. Many, who in the pre-assessment could identify a subject and talk about it from memory only, were now able to read and comprehend the complete policy or procedure item. Their understanding of workplace vocabulary had also increased. The post-assessments provided CEI staff with an opportunity to talk with the participants individually about their plans and concerns around their future.

EVALUATION

FOLLOW UP INTERVIEWS

In 1998 the CEI Executive Director visited most of the partner companies to interview former students and managers concerning their experiences with the program. He met with 3 former students, the production supervisor, and the planner who was a member of the EIT. Each interview was recorded and then transcribed. Below are some of the interesting findings:

Production Manager "Early on when the decision was announced to close the division …we had an aggressive program to place people internally…so that people could read about job opening on the bulletin board or the handout that came out every Monday morning. And there's a process, you fill out a job fit form where you put your name, and your current job grade, and then you list your experiences that you have that you think would be applicable for the job you're trying to get. Well, for a number of cases I would get these job forms and attached to them would be resumes which were just astounding. I mean I don't think I've ever seen resumes from any of the direct labor people that have worked for me for years. For the most part the resumes they were giving to me were the ones they had written in class… I'm going to say a

good percentage of those people that we placed at another jobs internally are people that have gone through the program."

Planner "The fact that they participated in a lot of educational programs, the *Global 2000*, including the CEI ADP, is the reason they were in the jobs they're in now. They would not have been able to do this job, it's one of the highest skilled jobs here. The first thing that impressed me was ...that I'd go out to the shop floor, people would say hello and they'd start talking to me. Before they wouldn't, they'd point to the group leader or whatever. You could just see that there was much more confidence in what they were doing. And, you know, if this plant closing had occurred three years ago, people would have been paralyzed, they would have been devastated....And you see what's going on, and of course I've been involved in this whole transition issue. It's amazing how people are dealing with it. I mean you talked to a couple of people today. How are they? They are upbeat, they're fine and they know they're going to be fine."

Group Leader " When I was in the program I was a group leader for the test department. Right now I'm a customer service rep. It was a promotion in that I can continue to work at Analog... As of 25 years working here, I'm not any more in production-manufacturing. The opportunity for me to grow is there, and I have to link this back into Analog, and the Continuing Education Institute for helping us out. Believe me without going through that I don't think I could qualify for this job. Without the help that I have here, and without CEI and Analog, that push us, management-wise, push us to the point that says yes go ahead and do, and you have to do it because it's for your benefit I was one that gained Now I am trying to pay back here to the company by using my knowledge and doing the best job I can on the position."

Production Worker "The program helped me to read better the procedures at work, to understand it better and it gave me confidence. When I saw something in the procedure I can't really understand, to go back to my leader, to my supervisor and ask them can you explain what this means, so it helped me a lot. The program was good."

ANALOG DEVICES, INC.

ATTACHMENTS:

- *Course Enrollment Statistics*
- *Employee Education Needs Survey*
- *Results of the CEI Individual Surveys*
- *Employee Education Needs Survey* -- Group Leaders/Production Aids
- *Results of the CEI Group Leader/Production Aid Surveys*

Analog Devices Norwood

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ADP*

Course Title	*Number Enrolled*
BSC Life Emp Wkshop 1	1
CAN Life Emp Wkshop 1	6
CAN Reading/Writing 1	6
CAN Math/Science 1	6
CAN Life Emp Wkshop 2	6
CAN Math/Science 2	6
CAN Rdg/Wtg/History	6

Summary for 'Type' = ADP (7 detail records)

Sum *37*

Type *ESL*

Course Title	*Number Enrolled*
Reading/Writing/Speaking Anal	9
Reading/Writing/Speaking Anal	13
ADI ESL01	13
ADI-02	15
ESLBasic	14
ESL Intermediate	13
ESL Intermediate Cont.	15
ESL Basic Cont.	12

Summary for 'Type' = ESL (8 detail records)

Sum *104*

Summary for 'Program/Contract' = Global 2000 (15 detail records)

Sum *141*

Summary for 'Company' = Analog Devices Norwood (15 detail records)

Sum *141*

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GLOBAL 2000
NATIONAL WORKPLACE LITERACY PROGRAM

CONTINUING
EDUCATION
INSTITUTE INC.

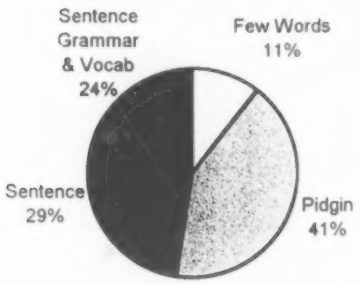
Pre- and Post-Assessment Tools: Analog Devices

Workplace Assessment: Analog Devices ESL Employee/Participants

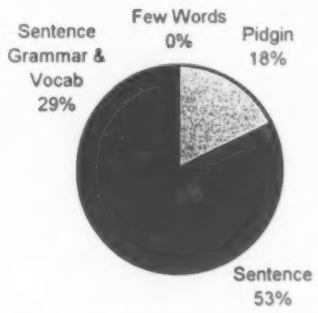
May 1997 ***19 Employees Assessed***

Speaks Clearly

October 1996

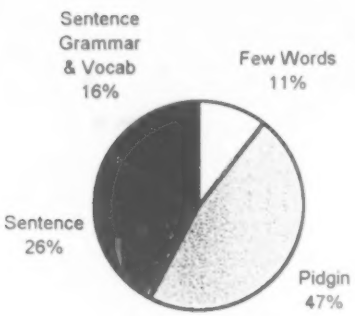


May 1997

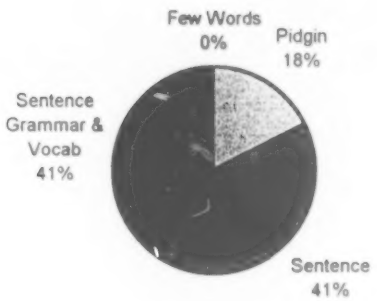


Explains Problems

October 1996

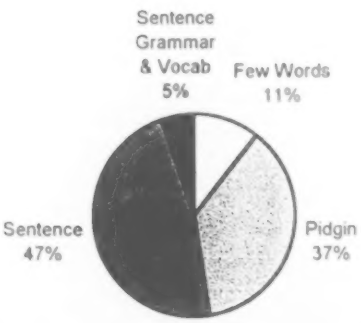


May 1997

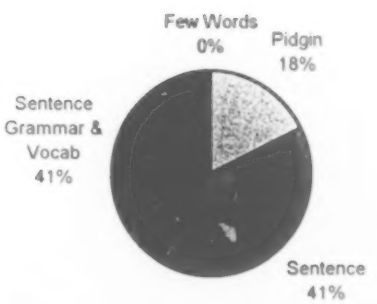


Key Terms

October 1996

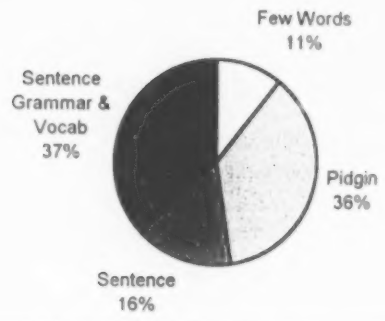


May 1997

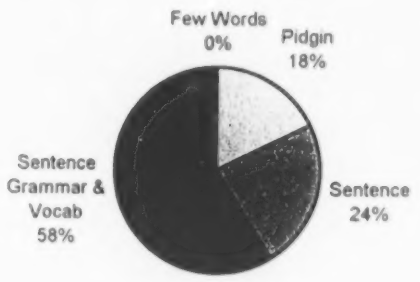


Follows Procedures

October 1996

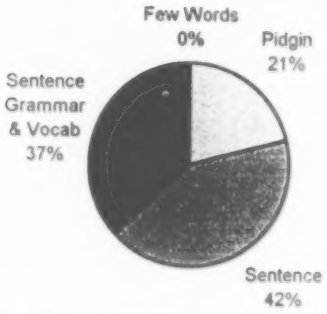


May 1997



Safety Signs

October 1996



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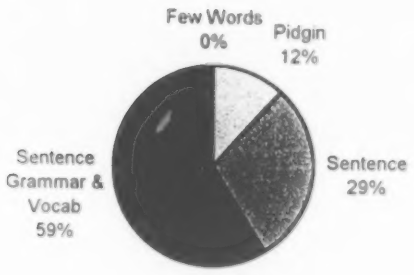
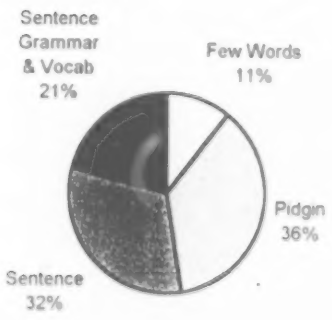


Company Policies

October 1996



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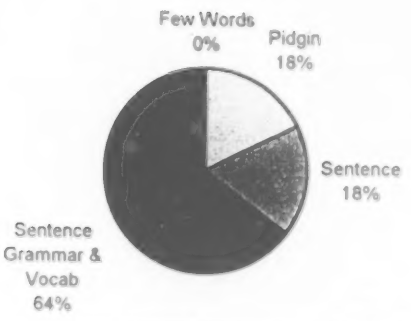

Name_____pre-date_____post-date_____

Assessment Scores

1. Speaks Clearly	1=few words	2=pidgen	3=sentence	4=sent/grammar/voc
2. Explains problems	1	2	3	4
3. Instructions/key terms	none	a few	some	everything
_____				
_____				
_____				
_____				
4. Follows procedures	cannot	a little	some	everything
_____				
_____				
_____				
_____				
5. Perf. Review	cannot	a little	some	everything
6. Safety sign/Msds	no	a little	some	everything
_____				
_____				
_____				
_____				
7. Company policies	cannot	a little	some	everything
_____				
_____				
8. Calculates	no	a few	some	correct
_____				
_____				
9. Writes defects	no	one word	some	everything
_____				
_____				
Totals	1=	2=	3=	4=

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Evaluation Questions

1 Speaks Clearly

2 Can explain problems and relate information

3 Understands verbal instructions and common key terms

4 Reads and follows procedures to perform job tasks

5 Reads and understands performance review form

6 Reads and understands Safety signs/visual aides/msds's

7 Reads and understands company policies and benefits

8 Makes required math calculations accurately.

9 Clearly explains in writing part defects.

70

#6 99

100

Key Terms:

overtime	dimension	setup	scar
scale	inspect	specification	tolerance
stressed	cracked	perameters	visual
criteria	flow	judgment	screen
overload	reflow	attach	repair
staking	check	print	saw
adaptors			

4.0 GENERAL RULES: (Cont.)

4.12.1 Area Group Leaders/Production Aides are responsible for ensuring operators in their departments are using the correct revision of a released Engineering/Manufacturing document. Reference 08-1482000, the Document Revision Browse Procedure.

4.13 Only properly grounded storage racks, carts, table tops, etc., may be used to store material in WIP. Units stores on racks etc., must be in dissipative anti-static trays. Under no circumstances is material in WIP to be placed on the floor for storage or staging as well as on the top of trash barrels.

4.14 When a work order is to be baked or cured in an oven refer to 08-1444700 for the procedure to be used for filling out the oven log sheet.

5.0 SAFETY:

5.1 Operators who are required to use a microscope as part of their job function will at the start of each shift, and as needed throughout the shift, clean the lens with the cleaning material provided by ADI.

5.2 All operators are required to follow all safety procedures and/or equipment noted in the detailed operating procedures such as safety glasses. Violations of this will be dealt with by using all disciplinary measures up to and including termination of employment.

5.3 The area supervisors will assure that all safety requirements are complied with for the safety of ADI employees.

5.4 All chemicals and/or hazardous waste must be disposed of in accordance to the applicable SCD and MSDS.

6.0 JOB TICKETS:

6.1 All units that are in trays or storage racks in Manufacturing will be required to have the appropriate job ticket attached to it. (ie Green (good),Brown (rework), or Red (scrap).

6.2 JOB TICKET:

6.2.1 A green job ticket will be attached to all trays and racks in Manufacturing which have passes the previous process step they shall be filled out as follows.

6.2.2 The job number is the job number found on the Lot Traveler and shall be filled in on all job tickets required for each job. (See figure 1.).

6.2.3 The model is the description of the unit being processed and is found on the Lot Traveler and shall be filled in on each job ticket required for a job. (See figure 1.).

6.2.4 The job quantity is the total units in a job or work order being processed and shall be filled in on each job ticket. (See figure 1.). Reference 6.4.2.

6.2.5 The tray quantity is the total units actually in a tray or storage rack and shall indicate the amount of units that are in that tray or storage rack that the job ticket is attached to. (See fig.1).

6.2.6 Grading should be left blank until the Test Department has determine that grading is required. If grading is required a separate tray shall be used for each type (ie J,K,L) and a job ticket shall be filled out for each graded type and attached to the appropriate tray. No tray shall have mixed grades in it. (See fig. 1.).

6.2.7 Before testing or inspecting a job, the operator must set up a tray beside the tester and attach a job ticket (Green for good units) with the job Number and model filled out. This tray will be used to put known good tested units in it. If more than one tray is needed repeat this step. Once the job is complete fill out the rest of the job ticket and continue processing the job.

6.2.8 The model P/N will only be used by the Stock Room. This is the cullinet assigned part number and will be filled in by the Stock Room. (See figure 1.).

6.2.9 The F.I.F.O. Date will also be filled out by the Stock Room. The F.I.F.O. is the date that sub-assemblies are received into the sub-assembly Stock Room. (See figure 1.).

6.0 JOB TICKETS: (Cont.)

6.3 REWORK TICKET:

6.3.1 During testing or inspection, when a unit requires rework or the unit is in question, a tray will be immediately set up with a rework ticket (Color Brown) attached to it before you continue to test the job. No units will sit on a bench unmarked. Units in a rework tray may be identified with either a data printout or various labels, stickers inspection tags or other forms of marking to identify the failure. (See figure 2) the same applies to known scrap units during test.

6.3.2 Continue to process the entire Lot.

6.3.3 Once the Lot is completed fill in the tray quantity and bring the units(s) to be reworked to the rework area. Retain the balance of the job in the original work center.

6.3.4 Once rework is complete the passing units will be returned to their original lot. Units to be scrapped will, follow Sec. 6.4.

6.4 SCRAP TICKET:

6.4.1 When a unit from a lot is scrapped it must be placed in a anti-static bag with a screen print copy of the cullinet move job showing the unit(s) have been scrapped off the system and tagged with a scrap ticket. (See figure 3) there can be more than one unit in a bag.

6.4.2 When units from a job are scrapped, the job ticket quantity will be changed to show the new job quantity. This is done by placing a line through the original quantity and writing in the new quantity. This also applies to the tray quantity.

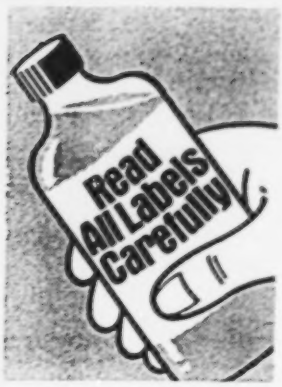
6.4.3 Scrapped units will be placed in the designated scrap units area. By the responsible Group Leader. Units are to be retained for a period of six (6) weeks by week. On the seventh week, scrap will be moved to a suitable reclaimation barrel.

7.0 EXPIRATION DATES:

7.1 It is the responsibility of the operator before using any material that has an expiration date to insure that the material is not out of date.

7.2 If any material is found to be out of date the operator will stop the operation and notify the area Group Leader.

7.3 The Group Leader will place any material that is found to be out of date in the designated area.


Read
All Labels
Carefully

report unsafe
CONDITIONS

SHUT OFF
POWER
before
cleaning
or
adjusting

when handling
CHEMICALS
wear approved
protection

Speak Up!
REPORT HAZARDS!

WAIT!
THE JOB'S NOT SAFE
TIL THE GUARD'S IN PLACE

FLAMMABLE
KEEP FLAME
AND
HEAT AWAY

DEADLY!
REPORT DEFECTIVE EQUIPMENT

QUALITY POLICY STATEMENT

Analog Devices is committed to the establishment and continuous improvement of world class systems and processes aimed at satisfying our customers' evolving needs.

We embrace a Total Quality philosophy with an emphasis on prevention rather than detection. We focus on technology, quality, reliability, service and cost in order to make innovative solutions available to our customers at minimized total cost.

Sample Questions.

Fill in the Sample Daily Worksheet with the following assumptions. Be sure to list the times, figure the totals and convert them to military time.

1. From 9:15 a.m. until 9:55 a.m. you did a Final Test on 6 Model # 28045-30. This was work order M401522.

2. From 9:55 a.m. to 11:00 a.m. you did Board Packaging on 35 Model # 27360-25. This was work order number DTS03461.

3. From 11:00 a.m. to 11:15 a.m. you took a break.

4. From 11:15 a.m. to 12:05 p.m. you worked on work order # TR46014 which was to Initial Test 12 Model # WR471-20.

5. From 12:05 p.m. to 2:30 you Cut Pins on 24 Model # WC450002 as indicated in Work Order # D48703.

Sample Daily Worksheet

Name_____ Shift_____ Date_____

Model #	W.O. #	Operation	Quantity	Multiple	Total Units	Uptime				Downtime			
						In	Out	TT'L	MIL	In	Out	TT'L	MIL

PAID HOURS_____ TT'L UPTIME _____ TT'L DOWNTIME _____

	QTY/HOURS	UNIT OF MEASURE		QTY/HOURS	UNIT OF MEASURE
1. Air Cool	_____/_____	Unit	9. Board Packaging	_____/_____	Board
2. Corona Test	_____/_____	Module/Bd	10. Initial Test	_____/_____	Unit
3. Cut Pins	_____/_____	Unit	11. Second Trim	_____/_____	Unit
4. Final Test	_____/_____	Unit	12. Second Test	_____/_____	Unit
5. Linearity	_____/_____	Unit	13. Recomp	_____/_____	Unit
6. CMR	_____/_____	Unit	14. EM/Assembly	_____/_____	Unit
7. Label/Package	_____/_____	Unit	15. Software	_____/_____	Unit
8. Board 1st Test	_____/_____	Board			

MIN	MIL	MIN	MIL
05	0.08	35	0.58
10	0.17	40	0.67
15	0.25	45	0.75
20	0.33	50	0.83
25	0.42	55	0.92
30	0.5	60	1.00

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Exhibit 3

MANUFACTURING DEFECT WORKSHEET

OPERATOR	OPERATION
DATE	1 POST SOLDER
MODEL	2 IN CIRCUIT TEST
WORK ORDER/LOT #	3 PREPOT PREBURN
LOT QUANTITY	4 BURNIN
QUANTITY FAIL	5 PREPOT POSTBURN
	6 POSTPOT PREBURN
	7 POSTPOT POSTBURN
	8 CUSTOMER RETURNS
	9 SUBASSEMBLY
	10 LASER
	11 PHASE
	12 FUNCTIONAL COIL

DEFECT	CODE
MISSING COMPONENT	C01
WRONG COMPONENT	C02
DAMAGED COMPONENT	C03
INSTALLED WRONG	C06
EXTRA COMPONENT	C11
PIN BENT UNDER	C12
HI COMPONENT	D03
SPOT MASK ON PCB	F05
UNSOLDERED	K01
SOLDER SHORT	K08
MISSING ETCH	N09
ETCH OPEN	N11
ETCH SHORT	N12
DAMAGED PCB/PAD	N13

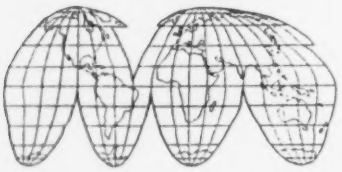
DEFECT	CODE
CONAP/POTTING ON PINS	P05
CONAP ON R/N	P15
ELECTRICAL FAILURE	R01
RETRIM	R03
RETESTS OK	R06
COMP. OUT OF SPEC	R07
OPEN COIL	R09
LOW INDUCTANCE	R10
PHASE	R11
SCRATCHED NETWORK	R20
OVERTRIM ON NETWORK	R22
NETWORK OTHER (SPECIFY	R25
FOREIGN MAT ON NETWORK	R30
OTHER (SPECIFY)	S01

OPER	DEFECT QTY	DEFECT CODE	DESCRIPTION	PART #	LOC	COMMENTS	S/N

(* ON C02 / R07 RECORD CORRECT VALUE / SPECIFICATION IN COMMENTS COLUMN)

REV. E

Global 2000: National Workplace Literacy
Manufacturing Program



Name_____ Department_____ Date_____

Employee Education Needs Survey

Please circle the number which best describes your ability to perform the following activities at work:

		Poorly			Perfectly
1.	Understand instructions in English	0	1	2	3
2.	Have confidence speaking English	0	1	2	3
3.	Read documents accurately	0	1	2	3
4.	Read and follow procedures to perform job tasks	0	1	2	3
5.	Read and understand Performance Review	0	1	2	3
6.	Understand how rates affect the Performance Review	0	1	2	3
7.	Make accurate Math calculations	0	1	2	3

Employee Interest Survey

Would you be interested in participating in the following classes?

	Yes	No	Maybe
English as a Second Language			
Reading			
Technical Writing			
Math			
GED Preparation			
Adult Diploma Program			

Please circle the best 2 days for your class: M T W Th F

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Apart from the Global 2000 Program, there will be an English as a Second Language class offered in January. Would you be interested in participating? Yes No (Please circle one)

To: List
From: B. Palumbo
Subject: Results of the CEI Individual Surveys
Date: Dec. 22, 1994 BP:121:94

Below is a summary of the survey given to individual employees in the Operations group at APD Norwood. The survey was taken on Tuesday Dec. 20, 1994. It was administered in small groups. There was at least one member of the Employee Involvement Team present during each administration. The survey was given to a total of 106 people during the morning. A script was used to explain the purpose of the survey (reference attached) in order that the same message be given each time. The questions follow below to facilitate the understanding the results of the survey viewed in the aggregate. The instruction given was to circle the number (0,1,2,3, poor to perfectly) which best describes your ability to perform the following activities at work.

1. Understand instructions in English
2. Have confidence speaking English
3. Reads documents accurately
4. Read and follow procedures to perform job tasks
5. Read and understand Performance Review
6. Understand how rates affect the Performance Review
7. Make accurate math calculations.

Would you be interested in participating in the following classes?
English as a Second Language
Reading
Technical Writing
Math
GED
Adult Diploma Program

Question #	Average Response	% responding 0 (poor)	% responding 1	% responding 2	% responding 3 (perfectly)
Question #1	1.87	11.3%	19.8%	39.6%	29.2%
Question #2	1.73	13.2%	21.7%	44.3%	20.8%
Question #3	1.75	13.2%	20.8%	44.3%	21.7%
Question #4	1.84	11.3%	17.9%	46.2%	24.5%
Question #5	1.82	13.2%	20.8%	36.8%	29.2%
Question #6	1.72	18.9%	19.8%	32.1%	29.2%
Question #7	1.63	17.0%	24.5%	36.8%	21.7%

In response to the willingness to attend classes in the above mentioned areas the results where as follows, (maybe was considered as a yes):

ESL	42.8%
Reading	38.7%
Technical Writing	37.7%
Math	22.6%
GED	10.4%
Adult Diploma Program	9.4%

It must be noted that most who responded yes to the GED classes also said yes to the Adult Diploma Program.

Global 2000: National Workplace Literacy
Manufacturing Program

Employee Name_____ Department_____ Date_____

Employee Education Needs Survey

Please circle the number which best describes your employees's ability to perform the following activities **in English** at work:

		Poorly----------			Perfectly
1.	Understands instructions in English	0	1	2	3
2.	Shows confidence speaking English				
	○ one-on-one	0	1	2	3
	○ in an informal group	0	1	2	3
3.	Reads documents accurately	0	1	2	3
4.	Reads and follows procedures to perform job tasks	0	1	2	3
5.	Reads and understands Performance Review	0	1	2	3
6.	Understands how rates affect the Performance Review	0	1	2	3
7.	Makes accurate Math calculations	0	1	2	3

Priority of Educational Needs

In the space provided below, please indicate which educational skills would be of greatest help to your employee:

_____

_____

_____

_____

Your Name_____

To: List
From: B. Palumbo
Subject: Results of the CEI Group Leader/Production Aid Surveys
Date: Jan. 16, 1995 BP:009:95

Below is a summary of the survey done by the Group Leaders/Production Aides in the Operations group at APD Norwood. The survey was done on Tuesday Jan. 10, 1995. Each Group Leader/Production Aide filled out one form for each of their employees with the assistance of Katherine Archer from CEI. The questions follow below to facilitate the understanding the results of the survey viewed in the aggregate. The instruction given was to circle the number (0,1,2,3, poor to perfectly) which best describes how you feel each employee in your group does in the area indicated.

The questions asked in both surveys were the same. However question two in the Group Leader/Production Aide survey was broken out into two parts; one on one versus in an informal group.

1. Understand instructions in English
2. Have confidence speaking English
   one on one
   in an informal group
3. Reads documents accurately
4. Read and follow procedures to perform job tasks
5. Read and understand Performance Review
6. Understand how rates affect the Performance Review
7. Make accurate math calculations.

Ques. #	Ave Response	% resp 0 (poor)	% resp 0.5	% resp 1	% resp 1.5	% resp 2	% resp 2.5	% resp. 3
Ques. 1	1.98	3.6	3.6	25.3	2.4	27.7	1.2	36.1
Ques. 2 A	1.90	7.2	4.8	24.1	0.0	27.7	1.2	34.9
Ques. 2 B	1.32	30.5	6.1	17.1	1.2	26.8	1.2	17.1
Ques. 3	1.50	16.9	8.4	21.7	2.4	31.3	0.0	19.3
Ques. 4	1.63	15.7	8.4	24.1	0.0	20.5	1.2	30.1
Ques. 5	1.72	4.8	10.8	24.1	2.4	34.9	0.0	22.9
Ques. 6	1.73	4.8	6.0	32.5	2.4	27.7	1.2	25.3
Ques. 7	2.37	2.4	3.6	6.0	0.0	33.7	1.2	53.0

As a basis of comparison the chart below compares the average results from each survey. Foe question 2 in the Group Leader/Production Aide survey questions 2.A and 2.B were combined.

Question No.	Individual Average Response	GL/PA Average Response
Question #1	1.87	1.98
Question #2	1.73	1.59
Question #3	1.75	1.50
Question #4	1.84	1.63
Question #5	1.82	1.72
Question #6	1.72	1.73
Question #7	1.63	2.37

To: List
From: B. Palumbo
Subject: Results of the CEI Group Leader/Production Aide Surveys
Date: Jan. 18, 1995 BP:012:95

After some discussion with my supervisors at a recent staff meeting it was suggested that the results of the surveys be compared not only by the average response to a question but also by the detail of each response.

Below is a chart that makes this comparion.

Question #	% of resp 0 (poor)	% of resp .5	% of resp. 1	% of resp. 1.5	% of resp. 2	% of resp. 2.5	% of resp. 3
Ques.1 ind	11.3		19.8		39.6		29.2
Ques. 1 GL	3.6	3.6	25.3	2.4	27.7	2.5	36.1
Ques. 2 ind	13.2		21.7		44.3		20.8
Ques. 2 GL	18.8	5.5	20.6	0.6	27.3	1.2	20.6
Ques. 3 ind	13.2		20.8		44.3		21.7
Ques. 3 GL	16.9	8.4	21.7	2.4	31.3	0.0	19.3
Quest 4 ind	11.3		17.9		46.2		24.5
Ques. 4 GL	15.7	8.4	24.1	0.0	20.5	1.2	30.1
Ques. 5 ind	13.2		20.8		36.8		29.2
Ques. 5 GL	4.8	10.8	24.1	2.4	34.9	0.0	22.9
Ques. 6 ind	18.9		19.8		32.1		29.2
Ques. 6 GL	4.8	6.0	32.5	2.4	27.7	1.2	25.3
Ques. 7 ind	17.0		24.5		36.8		21.7
Ques. 7 GL	2.4	3.6	6.0	0.0	33.7	1.2	53.0

List:
G. Hornsby
C. Sabourin
B. Simons
K. Archer CEI
L. David CEI
O. Picanco
N. DaCosta
J. Cerqueira
J. London
B. Murray
C. Gonsalves

Global 2000
National Workplace Literacy Partnership

Fire Control Instruments
Project Report
1994 - 1997

The Company

Fire Control Instruments (FCI), located in Newton, Massachusetts, designs and manufactures fire alarm systems and controls for commercial/industrial and institutional use. The fire alarm systems go to market through a network of domestic and international distributors. FCI employs approximately 45 exempt and 63 non-exempt individuals whose functions range from Research and Development Engineering to primary manufacturing. Educational levels within the company vary greatly as do native languages. The group for whom the educational training is directed are Chinese women assembling circuit boards.

Fire Control Instrument's goals in participating in the *Global 2000* project were to improve product quality, to improve the efficiency of the production process and to decrease the technical/engineering support needed for the operation of equipment. To accomplish its goals, FCI production workers needed to be able to read and follow visual aids and work instructions. These workers need to be able to read and understand the ISO9000 operating procedures and preventive maintenance procedures. Further, the Chinese production workers needed to be able to communicate in English in order to resolve problems effectively. All the Chinese women worked together in the same area and were supervised by a Vietnamese man who speaks limited Chinese. When this supervisor was off the floor or on vacation, all communication between the company and its production group came to a halt.

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Tel: (617) 926-1864
Fax: (617) 926-1865
E-Mail: cei@gis.net

Employee Involvement Team

CEI staff met with the Human Resources Manager (HR) and the Vice President of FCI to discuss the goals of the project and the function of the Employee Involvement Team (EIT). Subsequently, the HR manager assembled a team consisting of the Production Manager, an engineer, a technician, a group leader, the Vietnamese supervisor, a representative from the Chinese production group, the Quality Assurance manager, and the HR Assistant. The HR manager and CEI staff facilitated the meetings.

The Employee Involvement Team's first task was to design a Needs Assessment Survey which would give the team a clear picture of specific educational needs of its Chinese production group. Once the team had developed the survey, the challenge was going to be in carrying it out. The team decided to assign 2 or 3 Chinese women to a team member who would then evaluate how well they actually understood each element of the survey. To be consistent, the team devised a script to use in their evaluating the candidates. Each team member also had a kit of company materials such as visual aids, safety signs, defective circuit boards, etc. (See: Needs Assessment Survey and Results attached)

The results of the EIT's survey demonstrated that the targeted group had little or no understanding of verbal and non-verbal instructions. These results, together with the weekly manufacturing yields, did explain to some extent why the production yields were so erratic: communication between the company and its Chinese workers was limited.

Recruitment was not an issue for the EIT; all the Chinese women were eager to attend an English as a Second Language (ESL) class. Instead, the team needed to look at times for instruction that would be least disruptive to the production process. Early morning, twice a week was determined to be the best time. The Production Manager's presence on the team proved to be critical in working out the logistics of opening the building, adjusting time cards and scheduling work around the absence of the employee/participant group.

The EIT members had differing ideas about the ultimate success of the educational training for this particular group of employees. At the heart of the discussions around this issue was the belief that if individuals were really motivated, they would have already made more progress learning English. These opinions gave CEI staff an opportunity to describe in detail the difficulties the Chinese women would bring to mastering English; there are, basically, no corresponding elements such as alphabet,

sounds, verb tenses, etc. Talking about the hurdles Asian speakers have to overcome in learning English established an ongoing agenda topic. Throughout the EIT meetings in the project, team members were always keen to know about the learning process. Their interest manifested itself in the members' continuously seeking ways to support the Chinese women in their efforts to learn English. One of the ways the EIT demonstrated their support was in recruiting tutors from within the company.

To reinforce the English communication skills that participants were learning in the classes, the EIT recruited volunteer tutors from other areas of the company. CEI staff met with the tutors to instruct and encourage them in their role. It was important for the tutors to schedule the time to meet with their tutees, as the Chinese women were not likely, culturally, to intrude upon the tutors' time. Many tutors met diligently with their tutees and made a significant contribution to participant's progress. The FCI Employee Involvement Team met 13 times in 1994 and 1995.

Curriculum Development

CEI staff interviewed each Chinese employee to get a sense of their ability to communicate in English. Based on their English language and literacy, the women were enrolled into two classes, one a pre-literacy class of 12 women, the other an Intermediate group of 11 participants. In reviewing the information from interviews with the HR manager, the individuals who were unable to read in English became of particular importance. One of these non-literate workers was inspecting the completed boards. The HR manager realized that several production workers had been placed in inappropriate positions due to happenstance rather than having the skills to do the job. This realization prompted the HR manager and Production Manager to review the skills required to affect production jobs and then make sure the particular employees had the necessary skills to do the job.

English pronunciation strategies formed the focus of Curriculum Development at FCI. The pronunciation instruction centered around auditory discrimination between vowel sounds, speaking practice and sight reading. Picture dictionaries were an important learning tool for the pre-literate group. Various games were developed for participants to practice matching objects with their names. The Intermediate participants worked to expand their vocabulary through reading and group discussion. These classes also served to preview the vocabulary and issues presented in particular work-related training sessions sponsored by the company.

Outcomes

In preparation for the ceremony to mark the completion of the first year of the *Global 2000* project, each participant learned a speech in English. Participants in the pre-Literacy group told "stories" of their experience coming to the U.S. to CEI staff who wrote them down; participants memorized them. Intermediate participants wrote their own speeches and also memorized them. The Employee Involvement Team members, company management and tutors were present. For many, this was the first time they had had any communication with the Chinese women in English. Many of the participant's accounts were very moving and made a deep-felt impression on the listeners.

The following week, the Chinese women received certificates at a company "ice cream social."

Continuing: 1996

Instruction began again in the fall of 1995, at which time, 13 employee/participants were enrolled into the now Beginning level class, and 10 employee/participants into the Intermediate class. The **Curriculum Development** continued to feature pronunciation strategies in English, reading and workplace vocabulary development.

The Human Resources department developed a series of workshops on Women's Health issues. The concern of the HR staff presenting the workshops was that the Chinese women would not understand the content material and, therefore, miss out on important information. So prior to each workshop, the ESL instructors would give a pre-workshop, explaining the vocabulary and the basic subject matter.

Participants in the Intermediate class interviewed company management about various topics. They were expected to find out about all the other work areas in the company beside their own. They then created a visual chart of company activities which was assembled and posted on the company bulletin board. The **Employee Involvement Team** continued to seek ways in which they might support the Chinese women further in their efforts to learn English. A new idea was to invite two women at a time to attend a weekly meeting during which company managers and engineers reviewed and analyzed defective parts/products. The first occasion was not a success; the women did not participate in any way. The team members discussed strategies for making the women feel more at ease in these meetings, and their perseverance began to pay off. With a preview of what would be discussed at the meetings, the women gradually began to participate.

At the request of the Production Manager, CEI staff concentrated for several weeks in instructing their participants in learning a long list of formidable terms to be used in an upcoming work-related certification training. The brief time limit for absorbing all this new terminology added to the participants' heightened nervousness about the training. While the actual training was successful, the experience of preparing for it made the company more aware and appreciative of the effect of educational training and of the need for employee/participants to develop confidence in functioning in English.

The Employee Involvement Team, at the request of CEI, repeated its Needs Assessment Survey. CEI staff were planning to present a workshop on evaluation of workplace educational training at the National Workplace Learning Conference in Milwaukee and remembered that FCI maintained weekly production yield data. Maybe there might be a link between the *Global 2000* project and increased productivity. The team carried out their individualized surveys as before and found a significant change in participants' communication skills and an increase in production yields. A description about these surveys appears in more detail elsewhere in this report.

Outcomes

Before the conclusion of classes in 1996, FCI laid off many employees including 3 participants in the Beginning level class. The atmosphere in the workplace and classes was grim. The ceremony was, therefore, low-key and scaled down to a representative from each class giving a brief speech about their learning experience.

Several employee/participants in the Intermediate class were promoted: two of them to operate new equipment which required reading computer information, and the third, up-graded responsibilities in the Stock Room.

Adult Diploma Program

Several employees at FCI were assessed for participation in CEI's Adult Diploma Program (ADP). Two employees, including the Vietnamese supervisor and a group leader were selected for the program and traveled to a partner company, Boston Scientific Corporation, for classes. These individuals graduated in June, 1996. Subsequently, the supervisor was promoted to an engineering position and has successfully enrolled in a Bachelor of Science program at a technical institute. The group leader was promoted to supervisor.

Since the graduation of the *Global 2000* ADP participants in 1996, FCI has sponsored 2 employees in CEI's 1997 program, and 3 in the 1998 one.

Concluding: 1997

1996 and 1997 saw a lot of significant changes at Fire Control Instruments: the company was purchased by the Pitwell Corporation and moved its manufacturing operation to larger space in Waltham. Prior to the move, the EIT members took an active role in presenting the tensions and problems being experienced by the production groups. In the Newton location, the Chinese women were able to travel to work on public transportation; the new location in Waltham offered no public transportation. In addition to the transportation issue itself, the women had assumed that the company was trying to discourage them from moving to the new facility. Through the Chinese team member and spokesperson for the Chinese women, the company was able to counteract the misconceptions and let the women know how valuable they were to the company.

Throughout all the turmoil brought about by the move, what had emerged in the EIT was a sense of trust among its members. The EIT's role had shifted to include all kinds of issues affecting the production process. For instance, the team discussed the appearances of company favoritism for one ethnic group over others and ways to combat them. And always, the team was on the look out for ways to further integrate the Chinese women into company life.

The Employee Involvement Team in 1996 and '97 changed some what. The Production Manager, Assistant HR Manager and the Technician bowed out and were replaced by a new company Manager, Supervisor and Inspector. The EIT's role began to expand beyond its original parameters of the *Global 2000* to think about further educational training for other groups of employees within the company. The team also began to envision expanded training opportunities for the Chinese women which would necessitate their active participation.

In 1998 the EIT continues to meet on an as-needed basis and without CEI staff unless educational issues are being discussed. The team is seen as a model in the formation of new teams and is the primary planning group for all kinds of training in the company. The EIT recently put together a master training plan including projections and objectives for the upcoming fiscal year.

FCI discontinued classes during the upheaval of the move. The Intermediate class was reinstated, but as an afternoon class, two hours once a week. The Beginning group had dwindled to 4 individuals, and the team decided to postpone continuing instruction for them until later.

Because of the limited instruction time, the Intermediate class was expected to write daily in journals and to agree to expand their contact with English outside of class, such as watching TV in English, reading to their children, speaking with non-Chinese speaking co-workers, etc. The effort was to expand the two hours of instruction. The Chinese women complained constantly about the intrusion of "homework" on their lives, but the complaining ceased when they realized their English was improving. In class, **Curriculum Development** continued to focus on communicating in English. Participants developed questions and interviewed most of the management personnel and EIT members. Participants also wrote dialogs about work situations and performed them for the class with an emphasis on sense, --sentence intonations and stress.

A Beginning class was reformed towards the end of the project with 2 new hires to bring the enrollment up to 6 participants. This group also met once a week, so the EIT recruited tutors to help participants practice pronunciation and conversation in English during the week.

As FCI continues to support the two ESL classes beyond the *Global 2000* project, the ceremony in 1997 was less formal than previous ceremonies. All the participants, the EIT, tutors and representatives from management sat together and talked about their experience with learning. The communication barriers which existed at the beginning of the project seemed to have dissolved.

EVALUATION

FOLLOW UP INTERVIEWS

In August, 1998, the CEI Director conducted evaluative interviews with program participants. The following are some examples:

Stock Room Clerk – "So after I learn English in the class. So right now I not scared. I can talk to everybody at the monthly meeting and in the team meeting, and right now I try to talk everything in my life, including the job and include other things, my friends, my work-mates, and sometimes I think I talk funny talking English to my friends."

Director of Quality Assurance - "What has really been good on the quality side of things is that they have become much more aware of the different names of the defects that we were trying to instill in them all along the way here. We took actual defect names and causes into the classroom, and now they have a much better understanding so that when these things become apparent out in the manufacturing, they were able to recognize them, and communicate out there so that I don't have tons of rework that I have got to go and do as I did before". "The rework has diminished and flattened out to a point where it is controllable."

"Man Rai has been put, just recently, more in a leadership role because we put in what is called a Kanban material system....It's facilitated by tickets and different colors of tickets; and when something needs to be at a reorder point on the ticket, she is the facilitator for all the systems, and I really think she would have struggled with this three years ago, because she now has to communicate with all the English speaking folks in order to get this thing done. She has really stepped up to the plate. It's fun to watch....She already had the ability, the drive, and everything else, the will to do it, but she was reluctant because she was laid back in English."

I don't think it (the classes now that the grant has ended) should just end. I think there should be a lot of thought given to, let's say, what's next for these people, because I hate to see it revert back to even to where it was two years ago, much less three years ago. I think you always run the risk of that if you end a good program and you say, well, that's it, folks. Thanks, everybody. It could easily go back to taking a few steps backwards. So I think some thought needs to go into where do we go now."

"Of course that has helped too, because, for example, we have an ISO9000 audit, an outside auditor coming in to audit us, and it's a little bit easier if everyone understands how to prepare. There's a lot of preparation for one of these audits, and before, it was difficult to get that side of the company, the Chinese side, understanding what we were trying to accomplish. ...It simplifies it that they (the auditors) are not here as long. Instead of staying for three days when they come down, they might stay for a day and a half...The quicker we get them in and out of here, the less it will cost....I used to steer them (the auditors) away from that area (where the Chinese worked) and hope that they wouldn't walk in there. Come on. Let's go over here, and go over there....Oh (now) they can go wherever they want. I am not going to steer them in any direction."

"It's difficult, I think. There's a lot of work that went into this to put the program together. First of all the teachers and the management had to understand why people had to go to this a couple of hours here and a couple of hours there and how important it was. Something like this is, it's not a simple thing. It was a struggle, and if you multiply—I just think of how many other companies out there have non-English speaking people and how big a problem."

Head of Engineering - "We recently introduced cellular manufacturing instead of go/no go testing. Before each person had a job limited to a specific task such as inserting components into a circuit board. Now each production worker does all three tasks on a particular product. This is a much longer process, more complicated, and the worker must have a broader knowledge. All training is done in English. Without the ESL we would not have been able to transfer information and set up the cellular process. This would probably have required a translator for each individual. In 1995 all ISO documents were written in English and then translated. The introduction of the new cellular process took 1 and ½ years, Now we can produce the product as needed which means that the cost of inventory has been reduced. Labor is focused only on what is needed. Inventory is turned over more quickly and the product moves faster. This saves money and gets the product to the customer quicker or Just In Time. Without the ESL classes the changes in manufacturing would have taken 3 to 4 years, and the training would have been chaotic. The organization has been flattened and the front line supervisor and group leaders were eliminated. This saved the company a lot of money. Now the assemblers are able to assimilate the changes without much resistance. There was some thought that introducing ISO900 might cost people their jobs. Worker obsolescence is a major problem, and the company did not want to have

to fire all the assemblers. There was a lay-off during the program, but it would have been more severe if the classes had not been offered."

Manager of Human Resources - "CEI is different from other providers in that it looks at all the detail's of peoples' lives. CEI incorporates in its classes the educational needs and desires of every element of the company. One of the side benefits of this program has been the understanding of different cultures. The tutoring program that CEI set up has promoted change and diversity. As a result there is tremendous support at all levels from both the employee and the management for these classes."

Floor Inspector – "Well, because they (the Chinese workers) understand me better, when I give them corrected instructions of how to take and do their work, then they know what is expected of them, and that's why they have gotten to the point where they are today, where they can properly inspect their own work, and be relatively on their own."

"My job is much easier. I don't have to baby sit anybody anymore. Actually the new system of working is we don't have to build as many unit as we did before. . Because in the cell system you build to supply and demand where before we built to fill the stock requirements…There's less pressure. They can take their own time to take and do There is no push, push. Instead of one person just doing the building and another person doing the soldering, inspecting, etc. now the person can do the whole thing and now they are all doing their own testing." They couldn't have been trained if they didn't learn English."

"The Chinese people have become a very intimate community within the company. They are not just their own little cliques anymore. They are well they still a little cliquey but people have that tendency anyway, but they will communicate with other people now…without using an interpreter."

FIRE CONTROL INSTRUMENTS

ATTACHMENTS:

- *Course Enrollment Statistics*
- *Workplace Literacy Education Needs Survey* -- Employees
- *Workplace Literacy Education Needs Survey* -- Supervisors
- *Workplace Communication Skills* post-class student survey
- Findings, Observations and Recommendations
- *FCI Workplace Literacy Education Needs Survey* results bar charts

Fire Control Instruments

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ADP*

Course Title	*Number Enrolled*
BSC Life Emp Wkshop 1	2
BSC Reading/Writing 1	2
BSC Math/Science 1	2
BSC Math/Science 2	2
BSC Rdg/Wtg/History 2	2
BSC Life Emp Wkshop 2	2

Summary for 'Type' = ADP (6 detail records)

Sum *12*

Type *ESL*

Course Title	*Number Enrolled*
Reading/WritingFCIFall 96	13
FCI LangLiteracySkills01	11
FCI LangBasicSkills01	10
FCELangLiteracy Skills 02	11
FCI Lang Basic Skills 02	10
Reading/Writing Summer 97	10
ESL	5
Reading and Writing Spring 98	10

Summary for 'Type' = ESL (8 detail records)

Sum *80*

Summary for 'Program/Contract' = Global 2000 (14 detail records)

Sum *92*

Program/Contract **Private Sector**

Type *ESL*

Course Title	*Number Enrolled*
ESL	6
ESL	10
ESL 3	6
ESL Reading and Writing Fall 9	10

Summary for 'Type' = ESL (4 detail records)

Sum *32*

Summary for 'Program/Contract' = Private Sector (4 detail records)

Sum *32*

Summary for 'Company' = Fire Control Instruments (18 detail records)

Sum *124*

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FCI Workplace Literacy Education Needs Survey

EMPLOYEE SURVEY

Employee Name_____Department_____

Implementation team leader_____ Date:_____

PLEASE CHECK THE BOX WHICH BEST DESCRIBES YOUR ABILITY TO PERFORM THE FOLLOWING IN ENGLISH :

	YES	A LITTLE	NO
Speak clearly	☐	☐	☐
Can explain problems	☐	☐	☐
Relate information from meetings to co-workers	☐	☐	☐
Understand verbal instructions and common/key terms (i.e. polarity, flush, inspect, ECO, wetting, etc.)	☐	☐	☐
Read documents accurately	☐	☐	☐
Read and follow procedures to perform job tasks	☐	☐	☐
Read & understand Performance Review	☐	☐	☐
Read & understand safety signs	☐	☐	☐
Read & understand work instructions/visual aids	☐	☐	☐
Read & understand company policies & benefits (401(k), health, holidays)	☐	☐	☐
Make accurate math calculations (add(+), subtract(-), divide (÷), multiply(x))	☐	☐	☐
Convert or calculate fractions into decimals	☐	☐	☐
Fill out time sheets without help	☐	☐	☐
Explain in writing part defects	☐	☐	☐
Can write clearly	☐	☐	☐
_____	☐	☐	☐

Classes will be offered twice a week, 2 hours per session. One hour will be on company time (paid) and one hour will be on personal time (unpaid). Will you be able to attend?_____ If your answer is **NO**, what would keep you from attending?

Please circle:

- Best 2 days for your class M T W Th F

Please complete:

School grade completed:_____ Country:_____

- College completed:_____ Country:_____

FCI Workplace Literacy Education Needs Survey

SUPERVISOR SURVEY

Employee Name_____Department_____

Supervisor's Name_____ Date_____

To assist the company in providing basic education courses for its employees, please answer the following questions as objectively as possible. **Can the employee named above, perform the following in English:**

	YES	A LITTLE	NO
Speak clearly	☐	☐	☐
Can explain problems	☐	☐	☐
Relate information from meetings to co-workers	☐	☐	☐
Understand verbal instructions and common/key terms (i.e. polarity, flush, inspect, ECO, wetting, etc.)	☐	☐	☐
Read documents accurately	☐	☐	☐
R d and follow procedures to perform job tasks	☐	☐	☐
Read & understand Performance Review	☐	☐	☐
Read & understand safety signs	☐	☐	☐
Read & understand work instructions/visual aids	☐	☐	☐
Read & understand company policies & benefits (401(k), health, holidays)	☐	☐	☐
Make accurate math calculations (add(+), subtract(-), divide (÷), multiply(x))	☐	☐	☐
Convert or calculate fractions into decimals	☐	☐	☐
Fill out a time sheet without help	☐	☐	☐
Explain in writing part defects	☐	☐	☐
Can write clearly	☐	☐	☐
	☐	☐	☐

SUPERVISOR SURVEY -- ADDITIONAL INFORMATION

Which issues would you rate #1_____

#2_____

#3_____

Are there any additional issues you would add to the list? Please list them below:

_____

_____

_____

_____

_____

What are the key terms your employees need to know:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Results 2/95

FCI Workplace Literacy Education Needs Survey

EMPLOYEE SURVEY

Employee Name_____ Department_____

Implementation team leader_____ Date:_____

PLEASE CHECK THE BOX WHICH BEST DESCRIBES YOUR ABILITY TO PERFORM THE FOLLOWING IN ENGLISH :

	YES	A LITTLE	NO
Speak clearly	☐20	☐15	☐10
Can explain problems	☐23	☐14	☐8
Relate information from meetings to co-workers	☐24	☐10	☐11
Understand verbal instructions and common/key terms (i.e. polarity, flush, inspect, ECO, wetting, etc.)	☐27	☐9	☐9
Read documents accurately	☐22	☐10	☐13
Read and follow procedures to perform job tasks	☐24	☐7	☐14
Re[illegible] & understand Performance Review	☐23	☐12	☐10
Read & understand safety signs	☐32	☐5	☐8
Read & understand work instructions/visual aids	☐33	☐5	☐7
Read & understand company policies & benefits (401(k), health, holidays)	☐24	☐11	☐10
Make accurate math calculations (add(+), subtract(-), divide (÷), multiply(x))	☐37	☐2	☐6
Convert or calculate fractions into decimals	☐25	☐8	☐12
Fill out time sheets without help	☐42	☐2	☐1
Explain in writing part defects	☐22	☐11	☐12
Can write clearly	☐20	☐11	☐14
	☐	☐	☐

Classes will be offered twice a week, 2 hours per session. One hour will be on company time (paid) and one hour will be on personal time (unpaid). Will you be able to attend?_____ If your answer is **NO**, what would keep you from attending? YES - 33 NO-12

Please circle:
- Best 2 days for your class (19) 19 (11) 16 11 M T W Th F

9:15 to 9:30 — Break
9:30 to 11:30 — Training

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Please complete:
- School grade completed:_____ Country:_____
- College completed:_____ Country:_____

WORKPLACE COMMUNICATION SKILLS

Interview Questions:

1. Was the class helpful? Yes___ No___

   1a) If Yes, how was it helpful?

   2a) If No, why wasn't it helpful?

2. What instruction or activities did you find *most* helpful? *Least* helpful?

   2a) Did you find the book and materials helpful? What would make them better?

   2b) How would you describe the teacher's abilities? Give examples of some activities you would like to see included in the class., i.e., more student participation, required homework, etc.

3. What did you learn that you were able to use at work? Explain - Give examples.

4. Examples of improvement:

   4a) Do you feel more confident speaking English? If yes, give an example.

   4b) Do you now understand what others are saying in English?

   Much Better____ A Little Better____ No Better____

   4c) Do you feel more confident asking questions?

   Much Better____ A Little Better____ No Better____

   4d) Do you feel you can now ask questions about written procedures or work instructions?

   Yes____ No____

   If the answer is no, why ? Please explain.

5. Would you recommend taking an English class to your co-workers?

Yes____ No____

6. Do you plan to continue studying English? At work? Elsewhere? What would you like to learn?

Writing___ Speaking___ Reading___ Other___

7. How would you rate your progress since the English class started?

Speaking:

Much Better___ A Little Better___ No Better___

Reading:

Much Better___ A Little Better___ No Better___

8. What would help you learn English more quickly? Give examples, i.e., newspapers, children' s books, etc.

9. What would help you use English more often when you are at work?

QUESTIONS FOR MEASURING PROGRESS ON GOALS & OBJECTIVES

1. Can you now read visual aids, key terms and work instructions?

Before class:

Yes___ A Little___ No___

After class:

Yes___ A Little___ No___

2. Can you now explain problems in English?

Before class:

Yes___ A Little___ No___

After class:

Yes___ A Little___ No___

PRIMARY ASSEMBLY

TOTAL - 12 PERSONS

FINDINGS:

9 out of 12 persons possess "Little to No" skills in the 5 critical areas (speaking, explaining, understanding written and verbal instructions, and reading visual aids). Only 2 persons with good all-around skills as confirmed by supervisor's evaluation. Supervisors rate the group higher overall than they rate themselves (aided by an evaluator during rating). Particularly notable is the fact that 6 persons cannot read visual aids (by their own admission), 2 have little skills in this and 1 is very questionable.

OBSERVATIONS:

Overall, this group seems not to possess those skills necessary to produce product of a new or changing nature. Although they are probably quite effective with older products with which they are familiar and can rely on memory, they are probably not able to assemble contract boards or 7200 boards without an unacceptable rate of error as they cannot effectively use visual aids. This group possesses such limited skills that communication with english speaking employees is all but impossible. Interpretation would almost always be needed, thereby costing the team leader/supervisor excessive time.

RECOMMENDATIONS:

The ESL classes will help address our needs but it must be understood that this is not a "quick fix" and will take time . In the interim, this group should probably be kept on familiar product and not changed from line to line as the error rate will assuredly become unacceptable. One alternative might be to build inspection into the end of each slide line, utilizing a more highly skilled person who can read visual aids to assure quality. This individual should also have more advanced english skills to take some of the burden off team leaders/supervisors.

SECONDARY ASSEMBLY

TOTAL - 6 PERSONS

FINDINGS:

4 out of 6 persons possess "Little to No" skills of communication. 2 persons seem to have good skills but even those are not readily transferable. The supervisors rate the group better than they rate themselves, probably because they have become adept at dealing with certain individuals. 3 individuals have little to no ability to read visual aids.

OBSERVATIONS:

This group is more advanced in communicating than the primary assembly group, with most being able to speak, explain and understand at least a little english. The situation here may be complicated by a non-asian team leader who also needs enhanced english skills. Is communications a problem between team leader and group??

RECOMMENDATIONS:

This group might be able to benefit significantly from immediate visual aid training. They would be able to help each other and the instructor sufficiently and their skills could probably be upgraded quite quickly. Would also suggest that we assess internal communications within the group itself.

AUTO INSERTION MACHINE OPERATORS

TOTAL - 3 PERSONS

FINDINGS:

2 out of 3 persons possess "Little" skills of communication. 1 person can speak, explain, understand verbal instructions, and follow visual aids. All 3 individuals have "Little to No" ability to follow written procedures. The group rates themselves better than the supervisors rate them.

OBSERVATIONS:

This group is more advanced in communicating than the primary or secondary groups but they also must rely heavily on memory and learned practices as they are unable to read the operating and preventive maintenance procedures and programs. Their ability to make even minor modifications to equipment or programs is questionable as is their ability to interpret data to product specs. Their skills are probably machine-specific and are probably not transferable to different equipment. The time needed for technical support (Manufacturing Engineering) is probably quite high.

RECOMMENDATIONS:

This group will benefit greatly from the ESL classes. We can probably expect that after 2 1/2 years (to be validated by CEI trainers) all of the current group should be able to read and interpret written procedures. Any new hires to this group should be able to read, write and follow all operating and preventive maintenance procedures. This would allow you to keep required technical support to a somewhat reasonable level while the other operators acquire necessary skills.

QUALITY CONTROL

TOTAL - 2 PERSONS

FINDINGS:

1 individual is proficient in all areas and is attending college with little to no discernable barriers to communications. During self-assessment, the other person surveyed as having "Little to No" skills in everything, with "No" ability to read visual aids. (It is important to note that the self-assessment was done with the individuals direct supervisor assisting.) When evaluated by individuals who were accustomed to working with this individual, the employee's skills rating rose dramatically.

OBSERVATIONS:

The skills of this group are obviously critical to product quality. It would seem imperative that all involved have good communication skills so as to pass information both up and down the organization. The situation with one individual should probably be addressed immediately when it comes to ability to deal with new and changing requirements. As with other groups, this person is probably also relying heavily on memory and learned practices vs using visual aids and work instructions that reflect changes. Inability to communicate with direct supervisor can be very detrimental in this position.

RECOMMENDATIONS:

Immediate attention should be given to the education of the one individual noted. This individual indicates that they will acquire schooling outside of FCI. At the very least, immediate training with visual aids should be done at FCI. Communication needs will be much harder to address and take significantly longer. The corporation should insure that the outside schooling is sufficient for the individual's and the corporations needs.

PC TEST

TOTAL - 3 PERSONS

FINDINGS:

All 3 individuals are in need of ESL, based on supervisor's assessments. These indicate "Little" abilities for all individuals in all but one category (understanding verbal instructions). 2 employees rate themselves higher in some aspects but lower in ability to read and follow procedures. The comparisons between employee evaluations and supervisor's evaluations are inconsistent.

OBSERVATIONS:

The inconsistent reading may indicate lack of understanding (on the employee's part) of what the jobs actually require. The employees may feel that they are very qualified for these positions, when in fact, they only meet the basic requirements. Enhanced communications may do some good here; outlining the jobs, discussing qualifications, and stating clearly what future expectations will be. As this group is a "last check" for product quality, it would seem important that all involved have good communication skills so as to pass information both up and down the organization. As with other groups, these individuals may also be relying on memory and learned practices vs using test procedures that reflect changes. The team leader must spend a great deal of time with the individuals in this group, otherwise quality would have suffered dramatically.

RECOMMENDATIONS:

ESL classes will certainly help but constant attention must be given to those individuals with limited reading skills when it comes to a change of procedure. I can think of no easy way to do this, except constant vigilance on the part of the team leader until such time as the employee's have a better skill level. One consideration might be hiring a technician who will also work with the group to see that all procedural changes are caught.

FINAL ASSEMBLY TEST

TOTAL - 7 PERSONS

FINDINGS:

6 of 7 persons are seen as possessing good skills. Only 1 person does not possess ability to read and follow written procedures. There are 3 in the group who do have some difficulty in speaking english (includes one person who communicates with ASL). Group looks to be able to perform adequately.

OBSERVATIONS:

As a group, these individuals should be looked to for advanced learning, i.e., writing skills, basic electronics training, etc. (There is one exception to this.) In speaking with individuals in the department, I have found them quite eager and they are looking for ways to access training. A number have family circumstances which make this difficult, however. Enhanced communications will also do some good here; outlining the jobs, discussing qualifications, and stating clearly what future expectations will be. This is a good target group for career planning which can be an incentive for these individuals.

RECOMMENDATIONS:

One individual needs very basic ESL training. This may be quite difficult to accomplish, as this individual is out on leave-of-absence and may be returning on a part-time only basis. Advanced classes in writing and pronunciation will certainly help the remaining group. Several persons are good candidates for GED or the high school diploma program at Don Bosco. (Pat is assisting Yvans in enrolling in a GED program and CEI is assisting us with a pre-test to determine his current level.) Math training may also be appropriate for those pursuing careers in electronics.

TEAM LEADERS

TOTAL - 5 PERSONS

FINDINGS:

All 5 individuals are seen as possessing good skills by their supervisor. Only 1 individual needs (and is currently getting) intermediate ESL training.

OBSERVATIONS:

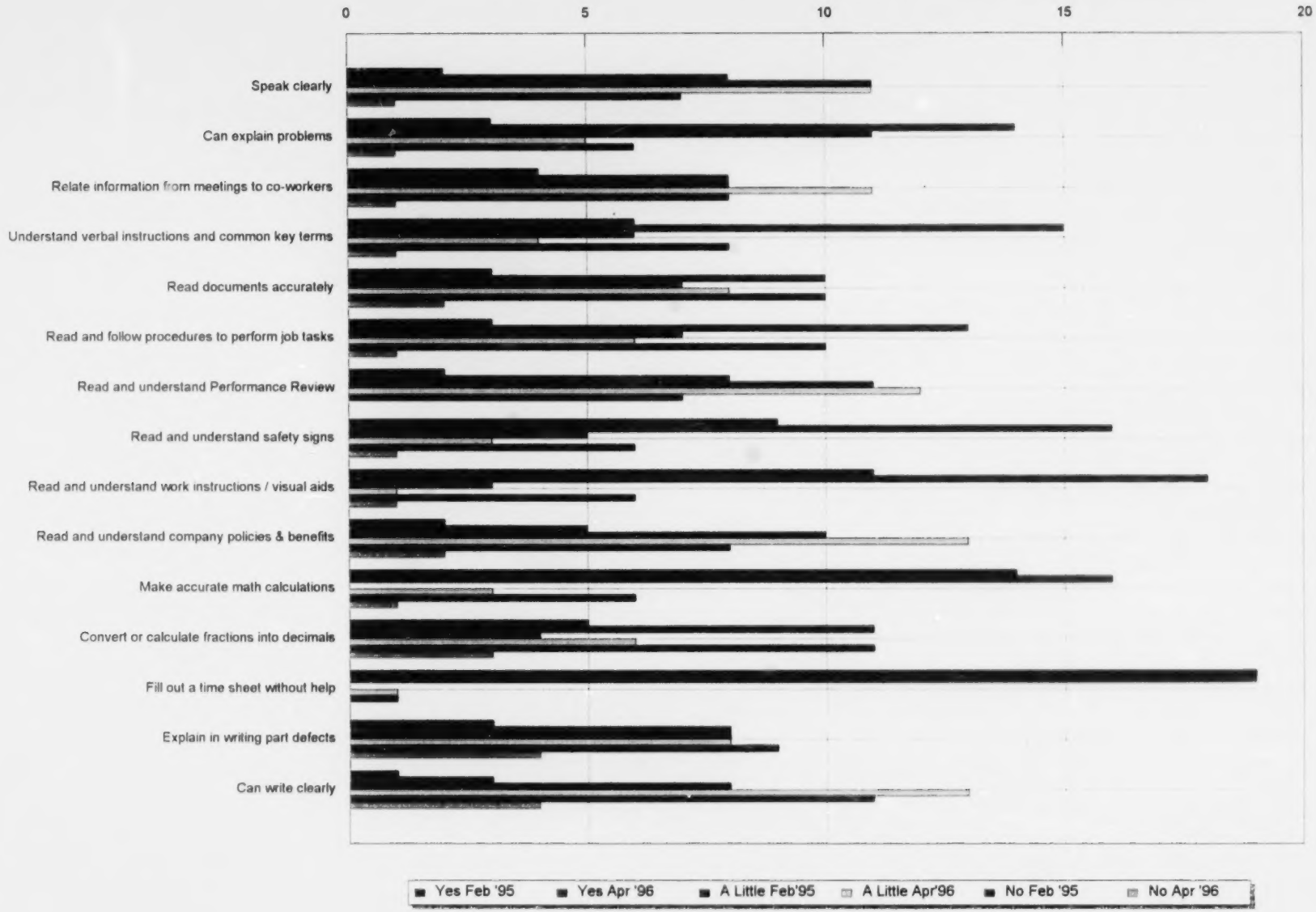
A lot of weight rests on the shoulders of this group. Not only are they responsible for getting quality product out the door, most are serving as interpreters in one form or another. For some individuals, the time needed for this must be excessive, given the findings in the survey. Whereas so much information flows through so few, quality could suffer badly if this group is limited in skills or access to support. I feel that the organization's ability to meet its committments rest on the shoulders of too few people. 5 team leaders, plus 1 hands-on manager, (who also spends a great deal of time providing "remedial" support) is assuredly not enough to meet the needs of an organization with a skills impoverished work force. The organization itself is quite probably suffering in a number of ways from resource impoverishment, i.e., not having enough key people to meet it's current commitments. I would seriously doubt that any new undertakings can be accomplished with any degree of success as this entire group is already working too hard to maintain the status quo. These individuals should certainly be targeted for career path planning and advanced training. I have found that these people "know how the watch works" and have great insight as to how to fix it when it doesn't.

RECOMMENDATIONS:

One individual should continue to seek ESL training. Another individual will benefit from advanced writing and training in english pronunciation. All persons need team leader training and workshops in a variety of subjects from interviewing to employment law. This should be done as soon as possible as some are struggling with decisions that cost them time they don't have.

FCI WORKPLACE LITERACY EDUCATION NEEDS SURVEY

Follow Up Survey April 1996

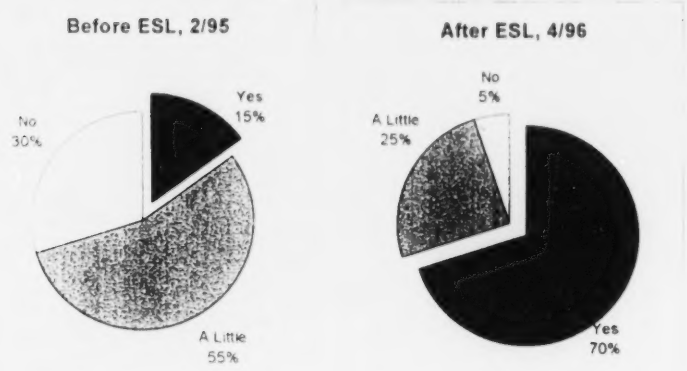


Continuing Education Institute's Workplace Education Assessment

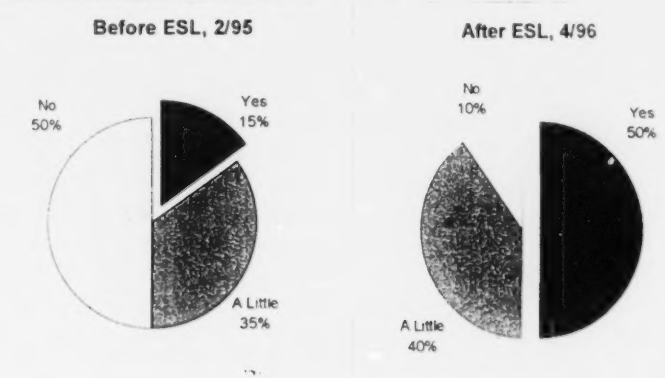
Supervisors' Surveys: Work Performance of Employee/Participants in English as a Second Language Program

Company: Fire Control Instruments

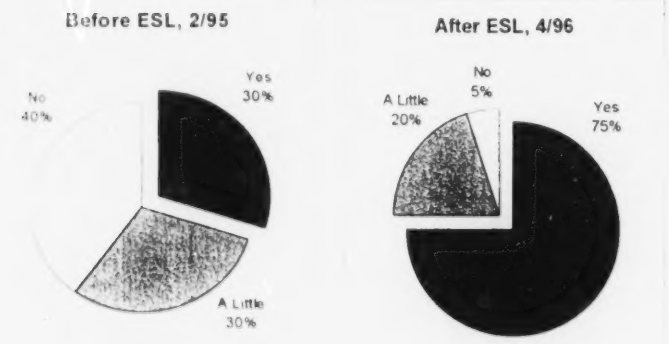
1. Can Explain Problems



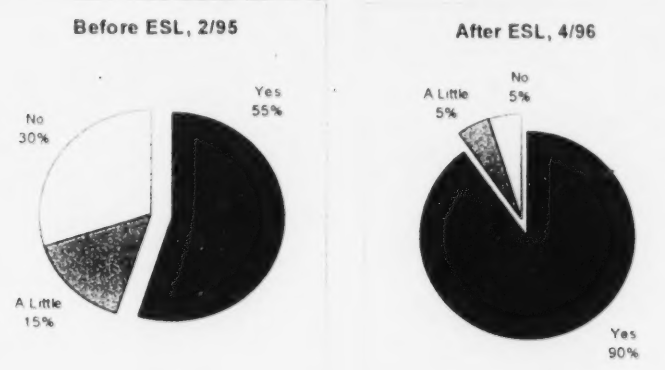
3. Reads Documents Accurately



2. Understands Verbal Instructions and Key Terms



4. Reads and Understands Work Instructions/Visual Aids



FIRE CONTROL INSTRUMENTS

STATEMENT BY
LOIS J. THOMS,
MANAGER OF HUMAN RESOURCES
FIRE CONTROL INSTRUMENTS, INC.
ON
WORKPLACE LITERACY

MAY 16, 1997

SENATE LABOR AND HUMAN RESOURCES COMMITTEE

Chairman Jeffords, Senator Kennedy, and Members of the Committee:

It gives me pleasure to appear before the Committee to speak to the issue of workplace literacy. During 1993 Fire Control Instruments, Inc. (FCI) began pursuing ISO-9001, (a certification) program which simply states that a corporation is certified to do business and subscribes to the principals and standards of the International Standards Organization. This is an important certification program that certifies corporations as viable entities capable of doing business in the domestic and international arena. One of the precepts of ISO certification is that corporations must "document what they do, and do what they document." What this means for the workers of American companies is that "Thou Shalt Read".

In pursuing this important certification, FCI became acutely aware, like hundreds of businesses nationwide, that our direct labor workforce was lacking basic skills, specifically in reading and writing. Through an article in Associated Industries of Massachusetts newsletter, the corporation became aware of the work that Continuing Education Institute (CEI) was involved in. We contacted Dr. Lloyd David, Director of CEI, to begin addressing our literacy needs. After an interview with Dr. David, FCI was invited to participate in a grant proposal to the U. S. Department of Education. This began our involvement with the Global 2000 project of the National Workplace Literacy Program. The grant proposal was successful and work on the program began late in 1994.

The first requirement that each of the companys involved in the Global 2000 project addressed under the program was the creation of an Employee Involvement Team (EI Team). FCI hand-picked individuals who understood the elements of the direct-labor workforce and

simultaneously were committed to making this program work. This group included individuals from Quality, Manufacturing Engineering, Production, Human Resources, as well as two individuals who were to be students in the program. This team became a "grassroots" force that began immediately to address the myriad of complex issues that need to be considered when instituting a workplace literacy program.

They began by constructing a workplace literacy needs assessment which identified the critical elements essential to acceptable job performance. Each of the 15 items on the survey addressed a basic literacy skill necessary to perform adequately in the workplace.

FCI is a small manufacturer with 106 employees. Out of 45 direct-labor participants in the first-round survey, the EI Team identified 20 assemblers whose first language was not English and who needed basic education, specifically in reading, writing and most dramatically, in speaking English in performing their daily duties. Each of the identified 20 workers were interviewed by a member of the EI Team to determine their ability in each of the 15 skill areas, such as speaking clearly, verbally explaining problems and reading documents. The survey was administered in February of 1995, before ESL classes began. The chart in Table 1 shows the results. In all but four items (filling out a time sheet, reading and understanding safety signs, reading and understanding work instructions, and making accurate math calculations), most of the workers evidenced a dramatic need for education.

It is important to note here that the survey items spoke to a corporate need for "functional literacy", which we have identified as the ability to communicate effectively and perform those tasks requiring skills built on the understanding of English terms that are dictated by the standards under which the corporation does business. These standards, depending on the business, could

TABLE 1: PRE-TRAINING (1995) RESULTS

	YES	A LITTLE	NO
1. Speaks clearly	10%	55%	35%
2. Can explain problems	15%	55%	30%
3. Relates information from meetings to co-workers	20%	40%	40%
4. Understand verbal instructions & key terms	30%	30%	40%
5. Read documents	15%	35%	50%
6. Read & follow procedures	15%	35%	50%
7. Read & understand performance review	10%	55%	35%
8. Read & understand safety signs	45%	25%	30%
9. Read & understand work instructions - visual aids	55%	15%	30%
10. Read & understand company policies	10%	50%	40%
11. Make accurate math calculations	70%	0%	30%
12. Convert fractions to decimals	25%	20%	55%
13. Fill out time sheet	95%	0%	5%
14. Explain in writing part defects	15%	40%	45%
15. Can write clearly	5%	40%	55%

include those prescribed by the ANSI or IPC (electrical or packaging) standards, the FDA for pharmaceuticals, etc., or the previously mentioned ISO standards, to name a few. Each set of codes or standards under which a business operates determines the language content for the business itself. These codes and standards filter through the particular workplace and become part of the corporation's functional language. Unlike traditional literacy programs, workplace literacy programs must grapple with this "new" language and insure that the practical application of ESL training also incorporates the "living" language of the business itself. The EI Team at FCI took the initiative to work with the CEI instructors and incorporate terms that applied to both the workplace and the outside world. It is my belief that this practical application of ESL had much to do with the success evidenced in the results.

Needless to say, the results of the first survey made management sit up and take notice. We had a significant number of employees who were relying heavily on learned skills (visual memory of how PC boards were to be assembled) and who were virtually unable to respond to the changes (Engineering Change Orders that dictate revisions to PC boards) that take place daily in production of a product. We were inspecting our quality into our product but we were incurring losses of time and money due to lowered first-pass yields of printed circuit boards.

During the year following the survey, employees were enrolled into one of two ESL classes based upon their level of ability. The first class had individuals who spoke very little English and were unable to read. Employees in the second class were more advanced, reading for the most part at a 4th grade level. Each class met for four hours each week, two hours on company time and two hours on the employee's own (unpaid) time. Classes met the beginning of the day from 7:30 - 9:30 A.M. Approximately 90 hours of instruction took place, with most people showing

perfect attendance. (This speaks highly of the commitment and the desire of employees to advance their skills.)

In April of 1996, FCI administered the same survey instrument to all employees who had been taking ESL classes through the program. There were significant gains in almost every area. Four key areas are attached here. The number of people who could "understand verbal instructions and common key terms" went from 30% to 75%; the percentage of people who could "read documents accurately" went from 15% to 50% and those who could "Read and follow procedures to perform job tasks" increased from 15% to 65%. Complete results are in Table 2.

As the survey indicates, the situation at FCI has improved dramatically. Supervisors and managers report that employees now show greater confidence in their ability to read and understand work instructions in English. In June of 1996 two employees graduated from the Adult Diploma Program, and three more employees will graduate this June. One of last years graduates is now enrolled in college pursuing an engineering degree . We no longer need to use interpreters during meetings or in our day-to-day conversations about work. The employees now speak up and ask questions, explain their problems more clearly, and seek clarification whenever they need.

The most dramatic evidence of improvement, however is not anecdotal but measurable and quantifiable. This is the improvement in our first-pass yields on printed circuit board assemblies. Two years ago prior to the Global 2000 program, there was significant fluctuation from week to week in our yields, and we averaged an overall 80% first-pass rate. Rework and related costs were considerable because of this. A year after classes had been held for an average of 200 hours, a 95% acceptance rate was achieved every week. During that year there were no other

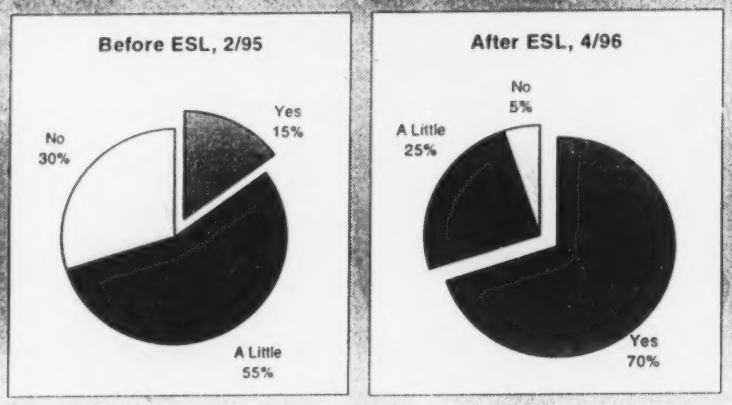
TABLE 2: POST-TRAINING (1996) RESULTS

	YES	A LITTLE	NO
1. Speaks Clearly	40%	55%	5%
2. Can Explain Problems	70%	25%	5%
3. Relates Information from Meetings to Co-workers	40%	55%	5%
4. Understand Verbal Instructions & Key Terms	75%	20%	5%
5. Read Documents	50%	40%	10%
6. Read & Follow Procedures	65%	30%	5%
7. Read & Understand Performance Review	40%	60%	0%
8. Read & Understand Safety Signs	80%	15%	5%
9. Read & Understand Work Instructions - Visual Aids	90%	5%	5%
10. Read & Understand Company Policies	25%	65%	10%
11. Make Accurate Math Calculations	80%	15%	5%
12. Convert Fractions to Decimals	55%	30%	15%
13. Fill out Time Sheet	95%	5%	0%
14. Explain in Writing Part Defects	40%	40%	20%
15. Can Write Clearly	15%	65%	20%

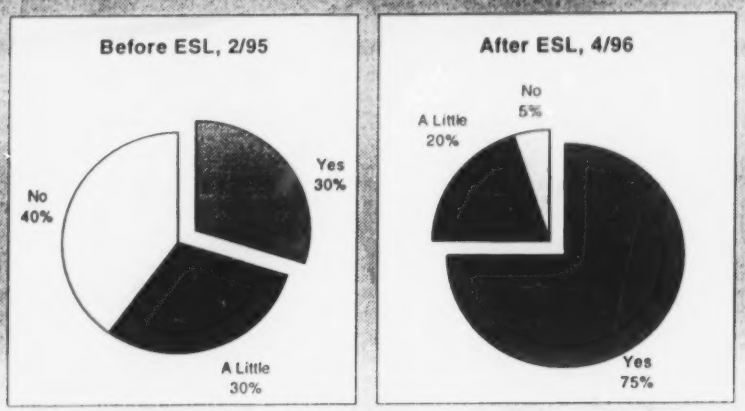
significant changes in products, processes, equipment or materials introduced to this group; it must therefore be assumed that the changes incurred can only be attributed to the ESL classes. In producing approximately 65,000 printed circuit boards each year, we have reduced the amount of rework on boards, dropping reworked boards from approximately **13000** to **3250** per year. **The failure rate for 1994 was 4 times that of today.** Due to this one factor, delivery time to customer has been reduced, labor cost on each board has been reduced, scrap rate and cost of material has been reduced, and our profit margins have improved and will continue to improve as today our first-pass yields are 96 to 97% consistently. **We are more competitive in the world-wide market.**

This evidence demonstrates to us that education and literacy levels are directly connected to productivity. FCI's experience with Global 2000 shows clearly that investing in basic education benefits the organization in ways too numerous to count and often in ways too subtle to demonstrate. As a corporation we are committed to improving the basic education level of our employees. We hope that the success demonstrated by the Global 2000 program will be utilized and built upon and that model projects of this type will be encouraged to proliferate for the good of both the American worker and American industry itself.

Fire Control Instruments Survey
Item 2 - Can Explain Problems



Fire Control Instruments Survey
Item 4 - Understand Verbal Instructions and Key Terms



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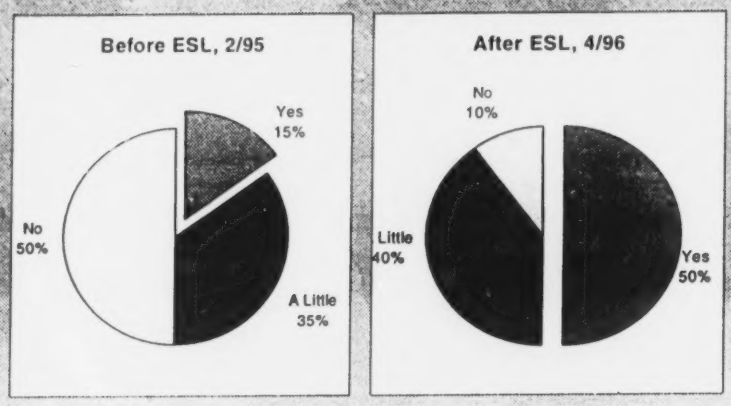
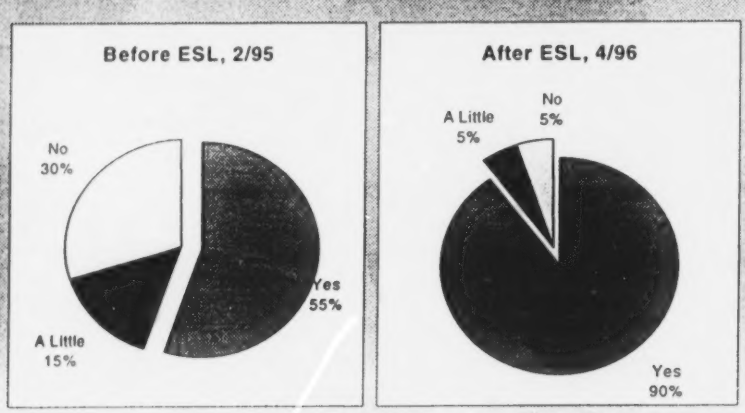
Fire Control Instruments Survey
Item 5 - Read Documents Accurately



Fire Control Instruments Survey
Item 9 - Read and Understand
Work Instructions/Visual Aids



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CEI

CONTINUING EDUCATION INSTITUTE, INC. SPECIALISTS IN WORKPLACE EDUCATION

GLOBAL 2000:

A NATIONAL WORKPLACE LITERACY MANUFACTURING PROGRAM

by Lloyd David, Ed.D.

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GLOBAL 2000:
A NATIONAL WORKPLACE LITERACY MANUFACTURING PROGRAM

by Lloyd David, Ed.D.

Five Massachusetts manufacturers have found productivity goes up when workers get up-to-speed on basic language and literacy skills. GLOBAL 2000 is a demonstration project funded by the National Workplace Literacy Program of the U.S. Department of Education. It is a partnership of five manufacturers - American Engineered Components, Analog Devices, Boston Scientific Corporation, Fire Control Instruments, and NIDEC/Power General- and an educational provider, Continuing Education Institute (CEI). The project's goal is to educate workers to make them more trainable, more flexible in terms of work assignments, and ultimately more productive.

To do so, GLOBAL 2000 offers classes in English communication, reading comprehension, business writing, and math. In addition, an Adult Diploma Program enables employees to earn a standard high school diploma. The students also learn how to use a computer so they can practice their new skills outside of class time. The program began in October, 1994. Thus far classes have enrolled over 600 workers from the five companies in workplace education classes in reading, writing, English as a second language (ESL) and math. In June, 1996, 43 people received their high school diploma through the CEI Adult Diploma Program.

A unique feature of the GLOBAL 2000 project is its management structure. Each company has selected a group of employees to serve on an Employee Involvement Team (EIT) with a representative from CEI. The team's first function is to determine the literacy needs of the company's workforce. Since each company has a different organization and ways of dealing with issues, their EIT uses different methodologies. Once they determine needs, the EIT decides which area to address and how best to do so. The EIT then recruits the employee/students, assists in curriculum development to make certain that the program is pertinent to the company and worksite, monitors progress, and helps evaluate the impact.

For example, the EIT at Fire Control Instruments (FCI) constructed a needs survey utilizing actual items that employees need on the job. Each of the 15 items addressed a particular skill. FCI is a small manufacturing company whose workforce includes 20 assemblers whose first language was not English and who needed basic education in reading, writing, and above all speaking English. Each of the 20 employees was individually interviewed by a member of the EIT to determine his or her ability in each of 15 skill areas, such as speaking English clearly, verbally explaining problems and reading documents in English. The EIT administered the survey in February, 1995, before the ESL classes began. The chart in Table 1 shows the results.

TABLE 1: PRE-TRAINING (1995) RESULTS

	YES	A LITTLE	NO
1. Speak English clearly	10%	55%	35%
2. Can explain problems in English	15%	55%	30%
3. Relate information from meetings to co-workers	20%	40%	40%
4. Understand English verbal instructions & key terms	30%	30%	40%
5. Read English documents	15%	35%	50%
6. Read & follow procedures in English	15%	35%	50%
7. Read & understand performance review in English	10%	55%	35%
8. Read & understand safety signs in English	45%	25%	30%
9. Read & understand English work instructions - visual aids	55%	15%	30%
10.Read & understand company policies in English	10%	50%	40%
11.Make accurate math calculations	70%	0%	30%
12.Convert fractions to decimals	25%	20%	55%
13.Fill out time sheet	95%	0%	5%
14.Explain in written English part defects	15%	40%	45%
15.Can write clearly in English	5%	40%	55%

During the year, employees were enrolled into one of two ESL classes based upon level of ability. The first class had people who could not speak very well and were unable to read English. Employees in the second class were more advanced in their literacy levels and were reading for the most part at a 4th grade level. Each class met for four hours per week, two hours on company time, two on the employee's own (unpaid) time. Classes met at the beginning of the day from 7:30 A.M. - 9:30 A.M. Around 90 hours of instruction took place, with most people having perfect attendance.

The first survey identified the extent of need and areas where it was greatest. A year later, in April, 1996, the company administered the same survey instrument to all employees who had been in the program. There were significant gains in almost every area. For example, the number of people who could "understand English verbal instructions and common key terms" went from 30% to 75%; likewise the percentage of people who could "read English documents accurately" went from 15% to 50% and those who could "Read and follow procedures to perform job tasks in English" increased from 15% to 65%. Complete results are in Table 2.

TABLE 2: POST-TRAINING (1996) RESULTS

	YES	A LITTLE	NO
1. Speak English clearly	40%	55%	5%
2. Can explain problems in English	70%	25%	5%
3. Relate information from meetings to co-workers	40%	55%	5%
4. Understand in English verbal instructions & key terms	75%	20%	5%
5. Read English documents	50%	40%	10%
6. Read & follow procedures in English	65%	30%	5%
7. Read & understand performance review in English	40%	60%	0%
8. Read & understand safety signs in English	80%	15%	5%
9. Read & understand English work instructions - visual aids	90%	5%	5%
10.Read & understand company policies in English	25%	65%	10%
11.Make accurate math calculations	80%	15%	5%
12.Convert fractions to decimals	55%	30%	15%
13.Fill out time sheet	95%	5%	0%
14.Explain in written English part defects	40%	40%	20%
15.Can write clearly in English	15%	65%	20%

Supervisors and managers report that employees now show more confidence in their ability to read and understand work instructions in English. The company no longer needs to use interpreters during meetings. Also employees are more willing to ask questions and to request clarification when they do not understand.

The productivity improvement by the students who assemble circuit boards was more significant to the company. One of FCI's major goals was to achieve a weekly rate of at least 95% first pass acceptance of circuit board production. This would reduce rework and save in scrap. During the first 15 weeks of 1995, prior to the start of workplace basic education classes, only two weeks had a production acceptance rate reaching the target of 95%, and there was significant fluctuation from week to week, which meant a great deal of re-work. A year later after classes had been held for an average of 200 hours, the 95% target for board acceptance was achieved every week. During that year there were no significant changes in products, processes, equipment or materials introduced to this group so that the change could only be attributed to the ESL classes. The company estimates that the ESL classes saved time in re-work, lower percentage of defects and less scrap.

This study shows that raising employees' educational level is one of the best ways to improve productivity. Reports from both supervisors and employees attest to the benefits of the program. As our experience with GLOBAL 2000 demonstrates, investing in workers' basic education benefits the entire organization.

Raising Employees' Educational Level Improves Productivity

Five Massachusetts manufacturers have found productivity goes up when workers get up-to-speed on basic language and literacy skills. GLOBAL 2000 is a demonstration project funded by the National Workplace Literacy Program of the U.S. Department of Education. It is a partnership of five manufacturers — American Engineered Components, Analog Devices, Boston Scientific Corporation, Fire Control Instruments, and NIDEC/Power General — and an educational provider, Continuing Education Institute (CEI). The project's goal is to educate workers to make them more trainable, more flexible in terms of work assignments, and ultimately more productive.

GLOBAL 2000 offers classes in English communication, reading comprehension, business writing, and math to employees of the five eastern Massachusetts firms. Its Adult Diploma Program enables employees to earn a standard high school diploma. Students also learn to use a computer so they can practice their new skills outside of class time.

Since the program began in October 1994, more than 440 workers from the five companies have enrolled in reading, writing, English as a second language (ESL), and math classes. In June 1996, 40 participants received their high school diploma through the CEI Adult Diploma Program.

Each participating company selected a group of employees to serve on an Employee Involvement Team (EIT) along with CEI staff to determine the literacy needs of the company's workforce and consider which employees to offer educational training to. The EIT is responsible for recruiting participants, assisting in tailoring the curriculum to the company, and monitoring and evaluating participants' progress.

For example, the EIT at Fire Control Instruments (FCI) in Newton, a manufacturer of fire alarm systems, constructed a needs survey using skills that employees use on the job (speaking English clearly, relating information from meeting to co-workers, reading English documents, reading and understanding safety signs in English, converting fractions to decimals, etc.).

Each of the 20 assemblers (whose first language is Mandarin or Vietnamese) was interviewed by a member of the EIT team to determine his or her ability in each of 15 skill areas. The EIT administered the first survey in February 1995, before any instruction began. Among the findings: only ten percent of the workers spoke English clearly, only 15 percent could read English documents, and only 30 percent could understand English verbal instructions and key terms.

During the next year, employees were enrolled into one of two ESL classes, based upon level of ability. Each class met four hours a week, two hours on company time and two hours on the employee's own (unpaid) time. They participated in around 180 hours of instruction; most had perfect attendance.

The participants responded to the same survey in April 1996. Participants demonstrated significant gains in almost every skill area. For example, the number of people who could "understand verbal instructions and common key terms in English" rose from 30 percent to 75 percent. The percentage of participants who could "read English documents accurately" went from 15 percent to 50 percent, and those who could "read and follow procedures to perform job tasks in English" increased from 15 percent to 65 percent.

Supervisors and managers have reported that employees are showing more confidence in their ability to read and understand work instructions in English. The company no longer needs to use interpreters during meetings. Also, employees are more willing to ask questions and to request clarification when they do not understand.

Participants who assemble circuit boards also demonstrated significant productivity improvement. The company's major goals were to achieve a weekly acceptance rate of at least 95 percent first yields and to reduce rework and save scrap. During the first 15 weeks of 1995, before the start of English classes, assemblers reached the target acceptance rate only two weeks amidst unexplainable fluctuation from week to week, which meant a great deal of rework. A year later, after 180 hours of instruction, the 95 percent target for board acceptance was achieved every week. During that year there were no significant changes in products, processes, equipment, or materials introduced to this group so the company could only attribute the change to the ESL classes.

The GLOBAL 2000 project shows that raising employees' educational level is one of the best ways to improve productivity. Reports from both supervisors and employees attest that investing in workers' basic education benefits the entire organization.

By Lloyd David, Ed.D., president/executive director, Continuing Education Institute, Inc., Watertown, MA; 617/926-1864 or 800/390-0899.

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Originally published in **Target** magazine, the periodical of the Association for Manufacturing Excellence, June/July/August 1997, titled *Global 2000: A National Workplace Literacy Manufacturing Program*.

Global 2000

National Workplace Literacy Partnership

Boston Scientific Corporation
Project Report
1994 - 1997

The Company

Boston Scientific Corporation (BSC) is an international corporation with manufacturing plants in several states and in Europe. The manufacturing facility participating in the *Global 2000* project is located in Watertown, Massachusetts. The company manufactures invasive medical products, a variety of highly specialized catheters used in angioplasty procedures. The company is, therefore, highly regulated by the FDA. The Watertown facility employs over 800 workers, many of whom are non-native English speakers.

Since the late 1980s, the Boston Scientific Corporation has moved its production departments toward working in teams. The Continuing Education Institute (CEI) collaborated with the pilot team at BSC to provide English as a Second Language classes for its department's employees. As a result of that successful program, CEI incorporated the team model into its *Global 2000* project.

The company goals for participating in the *Global 2000* project reflect the nature of the products being developed and manufactured at BSC. The company stated the following objectives: to maintain the highest quality product while adapting to changes in the manufacturing processes; to have its employees able to communicate; read assembly operating procedures; interpret schematic diagrams of product and complete written documentation; to have its employees able to read and comprehend safety data sheets and accompanying chemical bonding agents and coating materials and to know what to do in case of spills; and, finally, to have employees upgrade their math skills in order to participate in Statistical Process Control training.

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Employee Involvement Team

The Employee Involvement Team (EIT) at Boston Scientific was made up of volunteer representatives from many different production areas including two supervisors, a trainer, and 6 assembly workers. The team leader, a supervisor, was also the leader in the pilot project and has remained the team's leader throughout the *Global 2000* project and to date. To assist in the start-up phase of the project, several members of the pilot team were also recruited for the EIT.

The initial team meetings were taken up with discussions of how best to include approximately 350 potential participants, day and evening shifts, in an ESL class and to inform them of the opportunity. The team finally decided to start with dividing the class slots between two-day shift production areas.

Members of the team would go to each department and, at a department meeting, describe the class and its purpose and that participants would need to make up two of the four instructional hours per week, i.e. the classes were held half on company time and half on the employees. As BSC offers employees flex time, having the employees make up class time was easier then trying to schedule classes during shift changes. Those employees interested in participating in an ESL class, they filled out a survey looking at perceived skill levels in English (See the attached BSC Needs Survey). The department supervisor was also asked to complete their own survey or add to their employee's. CEI staff received the surveys and then interviewed the candidates in order to place them in the appropriate level class. This Needs Assessment and recruitment process has been practiced successfully throughout the project.

The other aspect of the *Global 2000,* which occupied the team's attention was how the educational training should be evaluated. Some team members were in favor of pre- and post-testing of participants, but others thought a 15-week class was not long enough to show a lot of change. The team finally decided to gather "graduate" employee/participants, their supervisor and group leaders together to learn about any changes in the functioning of the department as a result of the ESL classes. The results of these evaluation sessions will be discussed in more detail in the *Outcomes* section below. The process, however, proved to be time consuming for everyone and not especially informative so it was abandoned after the second year into the project.

The EIT met, on average, 3 out of 4 times each month. The composition of the team itself changed every 4 months during the first year and a half of the project. In an

attempt to have representatives from the department sending participants to the classes and in sync with a day or evening shift, new members were recruited. This practice was eventually discontinued as it took new members too long to understand the workings of the team and become effective participants. By the second year, the team consisted of the two supervisors, the trainer, a group leader and two assemblers.

CEI Adult Diploma Program

After successfully recruiting participants for the ESL classes two departments at a time, the EIT needed to turn its attention to a company-wide information and recruitment process for CEI's Adult Diploma Program (ADP). BSC had requested 40 slots in the program and had also offered to host the classes for additional participants from partner companies. Team members and CEI staff provided information, class schedules and applications about the program during orientation sessions for both shifts. Soon after, the team scheduled dates and times for candidates to take an Assessment Test --reading, writing and math. The response was overwhelming! Over 200 employees came to the orientation sessions and 120 of them went through the assessment process. Selecting 40 participants from among the 120 candidates was especially difficult. At the team's suggestion candidate's supervisor's recommendations were added to the criteria for enrollment into the program.

The benefits of an Employee Involvement Team became especially apparent during the 9-month ADP program. Participants were unhappy with one of the instructor's teaching style but were hesitant to say anything to the instructor directly. Instead, they shared their issues with EIT members who brought these issues to the attention of CEI staff. Receiving feedback about classes instantaneously makes correcting them timely and effective.

In June 1996 38 of the 40 BSC employees enrolled graduated from Don Bosco Technical High School. (See the Survey of Graduates among the ADP materials in Item 1, *Global 2000* Final Report for **Outcomes**) BSC has continued to support the ADP for its employees.

Curriculum Development

Curriculum Development in the ESL classes at BSC relied heavily upon pronunciation strategies, communication skills and reading comprehension in English. The two main concerns of the company were for its employees to be able to communicate with each other and to be able to read and follow procedures. Any deviation from written procedures needed to be discussed in employee/participants' teams, approved by their supervisor, the engineering department and, eventually, the

FDA. Even timesaving suggestions were subjected to this rigorous analysis. Employees had to understand and follow procedures exactly and, should improvements be made, employees needed to be able to communicate with each other about them. Employees in this company come from many different countries, so English is their only common language; the use of English only is encouraged while employees are at work.

The EIT contributed to the Curriculum Development process by reporting comments about the classes from participants or their co-workers. Team members, for instance, suggested that participants needed to be more attuned to appropriate body language while at work as well as to be encouraged to ask for help. All these suggestions were incorporated into the ESL classes.

Outcomes

In 1995, 4 15-week English as a Second Language classes were completed. 53 employee/participants successfully participated in those classes. Department supervisors, leaders and trainers attended the ceremonies to congratulate the participants. Each participant had prepared written accounts of their experiences coming to the U.S. or of their experiences in a new culture. These accounts were printed into booklets, which were given out to members of the audience.

As referred to above, the EIT and CEI staff went back to interview participants and their supervisors several months after the conclusion of the classes. Half of the participants in the first group to be evaluated had participated in an earlier class apart from the project. This particular group had been non-literate in English, and at the conclusion of the *Global 2000* class, was, reportedly, functioning at a much-improved level in English. One woman had taken over the group leader's job for a week and had done an "excellent job." What made this report especially important was the participant had had very little confidence in the beginning and was by the end performing quite confidently.

Continuing: 1996

In the second year of the *Global 2000* project at BSC, 5 ESL classes were offered and attended by a total of 52 employees. The **Employee Involvement Team** continued its Needs Assessment and recruitment process. Different pairs of team members made the presentations to the departments, thus involving all the members equally.

The EIT consolidated its gains as a team by giving a presentation featuring the team's activities for the management of the company. The managers were impressed and

appreciative of the team's efforts. They asked numerous questions and complemented each team member for an outstanding job. After this event, the EIT went back to work feeling renewed.

The EIT conducted several more sessions reviewing the gains of employee/participant "graduates." An increase in confidence in communicating at work was the recurring theme throughout these evaluation interviews. One participant described his reluctance to make a suggestion about a way to shorten the time to do a procedure because he felt self-conscious about his pronunciation. After a lot of practice with pronunciation, he felt confident about making his suggestion, which was, ultimately, approved, and it led to changes which saved company time and money. Others talked about getting up at work for the first time and speaking in front of their work teams . And still others had found the courage to bid successfully on new jobs within the company.

While the graduates enjoyed the opportunity to talk about their experiences of learning and using English in and out of the class, team members concluded that the exercise was not really addressing their concern for evaluation of the project. After several discussions, the EIT decided to focus on supervisors' observations rather than continuing with the interviews of previous participants. Team members put together a questionnaire to be distributed to and completed by supervisors. The results of from this questionnaire were inconclusive, so the EIT backed off from its efforts to evaluate the project. (See Evaluation Attachment)

Curriculum Development in the ESL classes continued to focus on pronunciation, communication and literacy skills in English. As each class had its own character, the level of instruction varied accordingly. For instance, in classes for Beginning learners, the emphasis was on developing speaking skills. In Intermediate level classes, participants learned idioms in English and focused more on reading comprehension. Participants continued to write about experiences in their lives or in response to their reading assignments. Participants selected a written piece and revised it to be included in a booklet. At the concluding ceremony they either read their selections, or they presented something different.

Concluding: 1997

4 ESL classes were conducted in 1997 with 51 participants completing the classes. The formation of questions became a staple curriculum element in all classes. For the ceremony, which concluded the classes at BSC, the participants prepared questions to ask of the guests. In this instance, the guests were the company managers (including

the Vice President who was also on the GLOBAL 2000 Executive Board), supervisors and representatives from the Training Department. Participants asked questions about the formation of the company as well as future plans for the company. The audience became quite involved in the answers being given and used the occasion to ask questions of their own. Several participants commented that they had never asked their supervisor a question before and, while they felt nervous doing so, were now more confident about speaking up.

Members of the EIT were given certificates commemorating their service in the *Global 2000* project by CEI. BSC also gave all the team members certificates to exchange for a monetary reward; they were exceedingly pleased! Photos were taken to record the event.

The **Employee Involvement Team** became quite practiced at recruiting for classes and adept at organizing the orientations and assessments for the Adult Diploma Program. Team members began to look for other activities that they might organize in the company. But first they realized they needed to persuade the company to continue funding the ESL and ADP programs, so they campaigned successfully to get their requests included in the budget for 1998. The team continues to meet 2 -3 times per month, and its membership has remained the same.

Team members discussed the need for some sort of training for the leaders of the work teams in their departments. The company had an extensive training program for team members, but had not yet developed anything for the leaders. The team and CEI staff began to explore the skills that might be included in such training sketching out a preliminary curriculum.

In 1997, the company began to hold corporate meetings at a nearby hotel as part of an effort to inform the management, sales and marketing departments of company activities. Selective departments within the manufacturing facility in Watertown were asked to give presentations about their recent product advancements. A participant in a *Global 2000* ESL class volunteered to speak on behalf of his department. BSC management congratulated him for an excellent presentation. At a subsequent meeting in 1998, the EIT was asked to give a presentation about the *Global 2000* project. Team members who were also graduates of the ESL and ADP programs spoke, as did the team leader. The team leader was given the corporate group's first award for his outstanding contribution in developing employees in the company. The team leader and another supervisor on the EIT have both been promoted to Section Managers in the company.

EVALUATION

FOLLOW UP INTERVIEWS

In August, 1998, the CEI Director conducted evaluative interviews with program participants. The following are some examples:

Assembler -Graduate of the CEI Adult Diploma Program "Now I read job postings. I care more about the quality of my work not just the pay. I want a good review. The LEW has given me a future vision."

Machine Operator - Graduate of the CEI Adult Diploma Program: "Before I felt like a foreigner, now I feel I can communicate. Before I didn't know goals, now I have future plans."

Manufacturing Section Manager "One of the things we concentrated on related to Just in Time (manufacturing) was our people, and to have them work in teams, and one thing that we would ask from our people was that they be more flexible....Well, when you have a person just doing one or two operations, if somebody's out sick then things get bottle necked at that operation. One of the things we learned about through "just in time" is the need to reduce work in process. So educational programs not only help us with covering absenteeism, vacation, that type of thing, but it helps us reduce the amount of work in process, which basically helps us keep our dollars down, which is the key to business."

"Gee, we've got this program (creating a team environment), we really want to increase participation and team work, and we want to hear from our employees and solicit their ideas and their comments about production on the floor, get ideas for improvement. But the one thing they're asking from us is they would really like to improve their English skills. And that's where you guys came in....Well the biggest single benefit to this program is that we were able to attain our goal of complete employee flexibility. We wanted to be able to cross train people on various production jobs. We were able to do that. As employees gained confidence with their English speaking skills, they were easier to train....So they were learning and understanding verbal instructions better, they were certainly reading and understanding written procedures better, those are the two big things. Those are the

more important things we got out of the program. And a close second is, just in time environment, our meetings became more productive because people were willing to speak up. They had confidence in their skills, they were willing to offer ideas and suggestions, ways to improve our product quality, ways to reduce costs, ways to reduce waste, all of the things."

"The CEI Adult Diploma Program has been a huge success for us…It's funny, learning is a funny thing. If you're thinking in class, and you're being exposed to new ideas and participation in the classroom environment, all of a sudden I think it translates into some type of confidence that they want to participate and really use their mind on the job."

"I think the other training that we do is very job-specific. With these programs, I think the employees have a sense that yes, it's beneficial for the company, but it's also a personal development tool. So both win: the company wins and the individual employee wins, because these are skills that cross over, not only from the workplace, but into their home life."

"In order to improve yields in general, what it takes is a lot of communication not only downward communication from the supervisor to the employees but for the employees to work and discuss how to improve yields amongst themselves…And that's where the programs come in, they support improved communication, and allow people the confidence to communicate in a work team and work with each other to make these changes and to improve yields overall."

Training Manager "There's a concept in manufacturing called lead time, which is basically from the time you start a work order until you finish it. How many days is that typically? And I know we were in multiple days for most product lines, and now we are down to single days or half a day. So lead times were cut dramatically. We had a Just In Time program go into place. None of it could have been done if we hadn't had the operators involved. They are the ones who use the product—make the product every day, so they know, and they have great ideas. Some of it was a cultural issue. They weren't used to speaking up and that wasn't appropriate for them. Others were language barriers. Some it was just communication between groups, or just plain how do you go up and approach somebody without feeling afraid of doing it, and had nothing necessarily to do with language.."

"We are certified ISO9001, and we had to have a whole complete audit, re-certification audit, and there was not one thing they could find to write down as an

observation. They were extremely impressed with the ability of the operator to answer questions, find their training records, knew who was training them on what. They just were like, "Wow, you guys, continuous improvement!" The auditors…did training extensively even when they were on the production floor because they were interested in seeing how the operators responded to questions, and they all did great."

"I think you (CEI) were all very much in tune to how we did things here and the class has reflected that. There—it wasn't just a typical English as a Second Language class. It clearly was geared towards working with Boston Scientific. They knew we were in teams, so they worked in small teams in the classroom to simulate that. They gave them skill sets, communication skills set that weren't just using the right words when you speak, but how you use body language, and how you phrase things and the effect it has on people. So they were really backing up our team training and reinforcing it."

"I don't hear lately, "we have all these people that can't read, and we have all these people to train who can't figure out math so no news is good news."

"When people say to me, "let's justify this", I can remember John Wilson, the Vice President of Operations/Watertown, saying this is so intrinsic, you just don't justify it. It just sort of like they need water and air and food. People need to have these skill sets, so there isn't any big justification we went through. If people can't read, and write, and do math, and basic things in the work place, and communicate with each other without getting angry or upset, or too shy to say anything, they can't….they just can't get their work done."

BOSTON SCIENTIFIC CORPORATION

ATTACHMENTS:

- *Course Enrollment Statistics*
- *Educational Needs Survey* -- Employees
- *Evaluation, Workplace English as a Second Language* -- Supervisors
- *Evaluation, Workplace English as a Second Language* -- Supervisors' results

Boston Scientific

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ADP*

Course Title	*Number Enrolled*
BSC Life Emp Wkshop 1	34
BSC Reading/Writing 1	34
BSC Math/Science 1	34
BSC Math/Science 2	29
BSC Rdg/Wtg/History 2	28
BSC Life Emp Wkshop 2	29

Summary for 'Type' = ADP (6 detail records)

Sum *188*

Type *ESL*

Course Title	*Number Enrolled*
ESL Boston Scientific 9, Fall 19	16
ESL Boston Scientific 8 Fall 19	17
ESL BSC LanguageCommunic.	15
ESL BSC Lang Com Skills 2 95	14
ESL BSC Lang Comm Skills B	13
ESL BSC Lang Comm Skills I	15
ESL BSC Lang Skills Basic C #	14
ESL BSC Language Skills Basi	17
ESL BSC LSBD #7	15
ESL BSC 10 1997	18

Summary for 'Type' = ESL (10 detail records)

Sum *154*

Summary for 'Program/Contract' = Global 2000 (16 detail records)

Sum *342*

Program/Contract **Private Sector**

Type *ABE*

Course Title	*Number Enrolled*
TeamLeaderSkills Workshop	13
TeamLeaderSkills Workshop	10
TeamLeaderSkills Workshop	12

Summary for 'Type' = ABE (3 detail records)

Sum *35*

Type *ESL*

Course Title	*Number Enrolled*
ESL BSC 11 1997	16
workplace Communication skill	16

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	Beginning ESL	1
	ESL Boston Scientific in Quincy	9
	Basic English Skills	15
	Basic English Skills	16
	ESL	3
	ESL	7
Summary for 'Type' = ESL (8 detail records)		
Sum		*83*
Summary for 'Program/Contract' = Private Sector (11 detail records)		
Sum		*118*
Summary for 'Company' = Boston Scientific (27 detail records)		
Sum		*460*

Boston Scientific-Quincy

Course Enrollment Statistics

Program/Contract **Private Sector**

Type *ESL*

Course Title	*Number Enrolled*
ESL Boston Scientific in Quincy	5

Summary for 'Type' = ESL (1 detail record)

Sum 5

Summary for 'Program/Contract' = Private Sector (1 detail record)

Sum 5

Summary for 'Company' = Boston Scientific-Quincy (1 detail record)

Sum 5

Global 2000: National Workplace Literacy Program

Educational Needs Survey

Employee's Name_____**Date**_____

Please circle one "X" which best describes your ability to function *independently* in English at work:

	Always	Often	Some-times	Never
1. Increasing your English skills would improve your job performance?	X	X	X	X
2. Are you comfortable speaking English?	X	X	X	X
3. Do you understand verbal instructions?	X	X	X	X
4. Can you read and follow directions/procedures to perform your job?	X	X	X	X
5. Do you speak English with your co-workers?	X	X	X	X
6. Do your ask co-workers to translate for you?	X	X	X	X
7. Do you explain work problems to a leader, co-worker, or supervisor?	X	X	X	X
8. Can you write notes, Job Bid, HR forms?	X	X	X	X

A. Please check __ any **changes** in your job since taking the Workplace English class:

___training for new procedures ___SME training ___Job Bid ___new job

___better communication with co-workers ___more confidence doing my job

B. Please ___check any **changes** outside your job since the class:

___attending ESL/GED class ___making my own appointments/phone calls

C. Other changes? Please explain

CE I

CONTINUING
EDUCATION
INSTITUTE INC. 35 HIGHLAND CIRCLE, NEEDHAM, MA 02194 [617] 449-4802

GLOBAL 2000 - Evaluation
Workplace English as a Second Language

Please complete the following form giving as many details as possible:

Employee/Participant _____ Date_____Dept_____

What **changes** have you observed in your employee in the following areas because of her/his participation in the English classes?

1. Noted in the Performance Review

2. Training in new processes

3. WorkTeam participation

4. Increase in WorkTeam yields

5. Safety

6. Increase in the "helping factor"

7. Confidence

CE I

CONTINUING
EDUCATION
INSTITUTE INC. 35 HIGHLAND CIRCLE, NEEDHAM, MA 02194 (617) 449-4802

GLOBAL 2000 - Evaluation
Workplace English as a Second Language

Please complete the following form giving as many details as possible:

Employee/Participant _____ Date_____Dept_____

What **changes** have you observed in your employee in the following areas because of her/his participation in the English classes?

1. Noted in the Performance Review (7)

8 performing better
3 speaks up more
2 takes time to make him/herself understood
1 improvement in verbal skills
2 makes great effort to use English skills
2 no longer afraid of challenge
1 still need to repeat instructions
1 same as before

2. Training in new processes

2 English has improved
1 some improvement
4 learning new processes faster
1 more comfortable with procedures
4 continues to train in new procedures
1 able to transfer knowledge
4 able to train others
1 asks questions
3 training on different products
2 responsible as team leader for all training
____ no new training, but not asked

3. WorkTeam participation

4 participation has increased
3 excells
1 gives best team effort
1 will speak up now, didn't before
3 more willing to take on new tasks
1 needs improvement
1 needs to participate more

9 more comfortable in a team environment
2 works well with team
3 communicates more with other operators

4. Increase in WorkTeam yields (7)

2 increased yield though team
2 works on difficult product, increased yields are the team goal

5. Safety (7)

1 better understanding of procedures

6. Increase in the "helping factor"

2 will ask for help
6 will come forward in helping out and solving problems
1 can easily be understood
1 offers good ideas
1 will do more than required
1 understands team process better
1 willing to help train others
1 always learning something new
1 asks questions

____ same

7. Confidence

30 more confident
- regarding interfacing
- with others
- expressing him/herself
- completing inspection reports
- trying new things, or different tasks
- expressing own ideas

2 no major changes
1 always had confidence
1 improvement, but is it Eng?
1 doesn't say much
1 needs to be reminded to use English

1 volunteered to lead exercises
1 speaks English more frequently
1 makes effort to pronounce words correctly
1 more accepting of change
1 learning more each day
1 consistant results from group
1 tries to solve problems within group
1 increased yield

Global 2000

National Workplace Literacy Partnership

NIDEC/Power General
Project Report
1994 - 1997

The Company

Power General is a division of the NIDEC Corporation located in Canton, Massachusetts. The division designs, manufactures and markets high-quality, high performance power conversion products, AC and brushless DC tube axial fans and motors. The power supply manufacturing has been ongoing since the company's beginning in 1979; the fan manufacturing began in 1992.

In the Canton plant the company employs approximately 265 people, 178 of whom are hourly workers. Most of the power supply employees are Portuguese women who have been with the company long-term. With the addition of the fan production, younger Asian workers were hired. Space, heretofore, used for power supply manufacture was squeezed to accommodate the fans.

Power General's (PG) short- term goal in participating in the *Global 2000* project was to prepare for an ISO pre-audit in 1995. The company saw communication skills in English and an ability to read and follow process sheets as critical ones for its hourly workforce. The company also viewed improving these skills as important in the company's ability to grow the business and in meeting the company-wide focus on customer service and continuous improvement. More specifically, the company stated its goals and objectives for the education project as improving productivity and quality of the products, improving employee's problem-solving and team-building skills and in creating a more flexible workforce.

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Employee Involvement Team 1994 - 1995

The Training and Development Manager (T&D) recruited employees for the Employee Involvement Team (EIT) at Power General to include: an engineer, 2 technicians, power supply and fan supervisors, a group leader, a sales representative and an hourly worker from each product process. The T&D manager and CEI staff facilitated the meetings. Most of the team members were non-native English speakers and were, therefore, sympathetic to the communication issues of the company and the workforce.

The team's first task was to discuss and approve the goals and objectives of the company for the educational project. And the next step was to decide upon a Needs Assessment instrument. The team subsequently developed a survey that asked each supervisor to answer questions with input from each of his/her employees. The survey asked detailed questions about the employee's communication skills at work using workplace terminology, reading documents and making calculations. By conducting the survey in this manner, the team hoped the one-on-one approach would serve as an opportunity for supervisors to encourage their employees to participate in the classes as well. Responses from the surveys comprised a fairly comprehensive picture of workplace and individual needs and served to elicit considerable interest in the classes. 15 employees were enrolled into each of two ESL classes. (See Attachment: Needs Survey and Responses).

The team at Power General spent considerable time discussing ways and means to measure the relationship of instruction to an increase in productivity. Many possibilities were raised and discarded as being too complex, there being too many variables to cloud the trail. The proposed favored method was to give each participant a test at the beginning of the program and to repeat it at the end. However, this method, too, could not be developed further as there were too many different processes. In the end, CEI staff and team members conducted several focus groups with supervisors and interviews with management. The content of these meetings proved informative in developing the curriculum throughout the project. The Employee Involvement Team at Power General held 14 meetings in 1994 and 1995.

Curriculum Development

With lists of potential candidates for the English as a Second Language (ESL) classes, CEI staff arranged to interview each candidate in order to determine his/her educational needs and probable class levels. The interview process also discovered any barriers to successful participation in the program, such as child care or ride sharing issues. After the interviews, enrollees were divided into two classes, a basic

beginning group and a higher beginning group. These classes met two hour twice a week.

As limited conference space was in high demand in the company, classroom space was created in a corner of the cafeteria using makeshift walls. An indication of participants' increased confidence could be measured by their taking the initiative to leave the classroom and go out into the cafeteria and tell employees to please be quiet. As the program progressed, participants would just shout, "Quiet!" at employees on the other side of the wall. A continual effort was necessary to get the overhead loud speaker announcements turned off during class time.

The company management expressed their concern that all instruction be workplace-related. The goal of Curriculum Development in the project was to make all aspects of the workplace a primary instructional content. There are, however, important reasons to balance work-related instruction with basic communication and life skills. For instance, the main reason at Power General to include other than work-related curriculum material was that the learners needed a foundation of basic communication skills in English in order to have a context for work and life skills. Another reason for including other than work skills was that the participants were committing to half of the instructional time, and they had their own learning agenda.

However, participants at Power General (PG) were given a variety of instructional tasks describing their jobs. Instructors felt at a loss because participants knew more about their jobs than any instructor possibly could. Not being an expert at the participants' jobs meant that the participants needed to explain in greater detail than they usually did. To facilitate the process, small groups of employees would escort the instructor to their job area and show and tell the instructor about their jobs. At PG, too, there were two distinct products being manufactured so few processes were similar. Instructors also assigned small groups of participants to render their job functions in flow charts. The added challenge to making a flow chart is to demonstrate what happens before and after a particular process. Many PG participants had no idea about the process beyond their contribution to it thus creating further curriculum exploration.

Outcomes 1994 -1995

At the conclusion of classes in June1995, participants in each class prepared for a ceremony. As part of the classroom activities, participants wrote about their experiences immigrating to the U.S. For those participants unable to write in English, they told of their experiences to the instructor who wrote them down. Participants' "stories" were collected into a booklet and given out at the ceremony. Meanwhile participants practiced relating their experiences out loud in order to be understood by others. Those attending the ceremony were team members, group leaders, supervisors, and company management. Nervous participants told their stories to a stunned and impressed audience. Prior to this event participants strove to be invisible to their superiors: now they became known. Participants received certificates at the end of the ceremony.

Adult Diploma Program

CEI's Adult Diploma Program (ADP) was offered in 1995 with participants graduating the following year after completing 230 hours of classroom instruction. Partner companies had determined during the *Global 2000* proposal process how many seats each company wanted to reserve. The 4 participants from Power General joined with 6 participants from Analog Devices to form an ADP class which met in Canton. In addition to the high school curriculum requirements, CEI's diploma program includes a Life Employment Workshop offering participants an opportunity to identify their skills and to research their opportunities for career advancement. Three of the four PG participants (one participant withdrew due to family issues) earned their diplomas and received them in a ceremony held at the University of Massachusetts in Boston in June 1996.

Continuing 1996

Power General did not meet its goal to conduct a pre-audit for ISO certification in 1995. However, the company did determine that in order to meet the requirements for ISO certification, it would need many more documents to reflect the complexity of its manufacturing processes; many processes, especially in the more established power supply side of the business, were documented only by a bill of materials. A major effort was undertaken to document all processes.

A goal of the *Global 2000* project at Power General was to raise the participants' confidence in communicating in English. Those participants who worked on the fan manufacture demonstrated a greater willingness to attempt communicating with co-workers and with their supervisors. The participants on the power supply side made a greater effort to talk to their supervisor in English. Many of their Portuguese co-

workers, however, were steadfast in continuing to speak only Portuguese. One of the participants from this group who was also a team member discovered she could use the company paging system to practice her English.

The **Curriculum Development** continued to revisit ways to assist participants in increasing their workplace communication skills in English. Lessons designed to improve participants' workplace communication skills included their making maps of their work areas, their copying signs in their work areas and learning their meaning and compiling a glossary of workplace terms. Management and supervisory personnel were invited to be interviewed by the class members who had prepared by learning question forms and practicing the questions they would ask. The interviews proved to be a great success!

Recruitment for the classes in 1996 was accomplished by notices on the bulletin boards and by employees signing up through their supervisors. As participants progressed, the focus of instruction changed to reflect the increased skill levels. The Intermediate level ESL class was changed to a Reading and Writing class and had 14 participants; the Beginning class remained a basic level class and had 11 participants including a larger number of new participants than the more advanced class. Members of the Reading/Writing class took the CEI Reading Assessment prior to the start of classes and again at the end of the year. On average. reading grade levels increased by 2.4 over a 6 month period.

Two computers were installed in a corner of the classroom to give learners additional and different ways to practice their English skills. Participants were trained in accessing English and grammar programs and were encouraged to use the computers during class time and during their breaks. However, most participants were uncomfortable using the computers, so they did not provide the added practice as anticipated.

In addition to the 1996 and 1997 *Global 2000* classes at Power General, the CEI instructor tutored several employees on a weekly basis. Many of these tutees felt too self-conscious about their low level of English to enroll in the class, and one tutee had demonstrated a great enthusiasm for reading and writing in English but had child care commitments precluding her enrollment in a class. The team attempted to enlist volunteer tutors from among the employee ranks, but the more successful tutoring occurred when participants in classes sought their own tutors.

The **Employee Involvement Team** met 4 times during 1996. Those meetings were, primarily, to keep the team informed about the project, to get feedback from the members about the classes and to continue the discussion of how best to measure the effect of the classes. The team decided to re-do the initial Needs Assessment, asking supervisors to evaluate the progress they had observed in their employee/participants. The comparison of responses between the pre- and post-surveys did not present as clear a picture as anticipated because the same participants were not being compared in all instances. An analysis of the surveys was conducted by the *Global 2000* External Evaluator and showed an improvement in job performance and in communication in English. (See: Marribet Analysis Attachment)

The two production workers on the team had been reluctant volunteers and in the first year had spoken only when asked a question they could answer with 'yes' or 'no'. As their communication skills improved through the classes and their confidence increased, they began to contribute more readily to the team discussions. One of the Adult Diploma Program graduates joined the team replacing the technician who had left the company. She was a group leader and an articulate advocate for educational training.

The **Outcome** of the 1996 instruction culminating in the ceremony was again very positive. Participants in the Reading/Writing class selected a sample from their assortment of writing topics which, along with job descriptions and life stories from the ESL class, were assembled into a booklet. Participants read their selections and then received CEI certificates.

From the focus groups and interviews with Power General supervisors and managers, CEI learned that several participants had been promoted. One of the Portuguese women in the Power Supply business had learned to read which meant she could learn to operate a computer by following the written instructions on the screen. The woman, who had been practicing her English on the paging system, took the next step and sought out the technician or engineer she needed to solve machine problems instead of waiting for her supervisor to act as her interpreter.

Supervisors indicated that they were no longer "baby sitting" their employees; they could attend meetings such as the focus group and not be called out to sort out a problem, and, better yet, their employees would not just sit idle waiting for further instructions. As employee/participants reading and speaking skills in English improved, they were better able to function independently. A team member and class participant described how she was able to leave a written note to second shift workers

about the number of product parts still needing to be manufactured, thus saving the company from a lot of scrap. When asked what she had done before she learned to write, she commented that she had just gone home.

One of the managers remembered that before the *Global 2000* classes most non-English speaking employees turned away or looked too busy to talk should he stop and try to engage them in conversation. Now, in 1996, these same employees were no longer striving for invisibility but were more outgoing and willing to talk to him. He also spoke of the ceremonies giving him a new appreciation of these workers as individuals. But more important from a business point of view, the manager described that prior to the project, the company had intended to hire several new supervisors. However, as employees began to function more independently, the company no longer needed the additional supervisors.

Concluding, 1997

Instruction in 1997 followed the same plan as begun in 1996. New participants were interviewed by CEI staff and placed in the appropriate class, a basic level ESL class and a Reading/Writing class. 14 participants were enrolled into the ESL class and 13 were enrolled into the Reading/Writing class. New participants in the Reading/Writing were given the CEI Reading Assessment prior to start of instruction, and, as before, reading grade levels increased by at least two grade levels during the time period.

As a follow-up to the focus given to studying question formation in the classes and the subsequent interviews of managers, the ceremony in June 1997 featured participants asking questions they had prepared. The questions covered all aspects of the company from future business prospects to the date for the yearly company picnic. Several participants were emboldened to follow up their prepared questions with impromptu ones. The audience was impressed by the interest participants took in the company and the quality of the questions..

3 Employee Involvement Team meetings were held in 1997. The company has continued classes beyond the conclusion of the *Global 2000* project for their non-English speaking employees in 1998.

EVALUATION
FOLLOW UP INTERVIEWS

In August, 1998, the CEI Director conducted evaluative interviews with program participants. The following are some examples:

Machine Operator—"I learned to read English in the class, now I have a new job. I need to read the computer and bill of materials. Before my job was the same every day, but now I need to know how to read. Now there are new machines. If I don't know English I can't run that machine and have to do something else. Class also important to understand company policies and benefits. Before I was afraid to talk with people. When I saw somebody come fore the outside, I know that he was going to ask something I tried to run away to the other side. Now I talk to them. I know my English is poor, but I am not afraid no more. I talk and I explain my best."

CEO-"Three years ago when we started the ESL classes you couldn't get eye contact. Today they really go out of their way. They have a smile on their faces. They look up, they look you in the eye. You can say hello to them and they respond in a positive way. Their own personal self confidence in dealing with other people has risen. They show less discomfort with the environment, Before they weren't able to disclose themselves at all."

"There have been many changes on the floor in the last year. These changes would have been more difficult to implement – just telling people what was happening and re-orienting them to a new environment. I believe this is a better place to work This is a very diverse workforce. We used to have interpreters and supervisors who spoke the language which was fine compensation but in reality bad.. In order to be more competitive we have moved to teams which have to be able to communicate. You can't expect to have interpreters. We are moving away from supervisors and professional staff as being the only ones who can do anything. We want the workforce to help make decisions."

HR Manager –"I think ESL has changed people's mind set because it has made it easier for us to move people around for a more flexible work force. We can move people around to new positions or on different jobs as the company needs it, and we are able to do this because we can communicate to them what's happening . ….So it

sort of opened up their minds a little bit for the options of not being afraid to try different jobs"

"People are used to one day working on one job and another day working on another job. They are not afraid of change any more."

.. I think in the whole program is probably my one disappointment, is that there are still some people that just were, for whatever reason, would not go into it, would not go into ESL classes, and there are some people that really need to be in the classes…in most cases I think that it just was fear of going to the classes"

"Well, I think that the time is right now, I mean the manufacturing industry is not the same as it was five years ago, and companies that don't recognize that are going to be left behind. I mean companies have to cut expenses. You have to be more competitive. You have to be faster and better, and you have to have high quality products, and you can't do that if your staffing is the same as it was yesterday. ..Our competitor is doing things today that are preparing them for a whole new technology for tomorrow. So if you get something right the first time you can't just sit there. You have got to go forward with it otherwise you hit the bottom."

Vice President – "Our goal was to get our employees , who basically consisted of 2 language groups or ethnic groups Portuguese and Vietnamese , …to kind of form one groups and be able to communicate with each other because that was a problem in our facility. …We really wanted to be able to get involved in team based activities. Although we were not doing formal team based type of activities, what we found is that our employees could now after a couple of years of ESL classes, reading, writing, and a lot of speaking, obviously could communicate with each other; and ,therefore, were able to resolve conflict and misunderstanding much easier."

"So we decided to move along in the process of getting ISO9001 certified. In order to do that our employees had to be able to read work instructions and be able to read policies and procedures, and so we had to do was document the way we do things in our factory….Well if we had done that with the same group that we had had before the GLOBAL 2000 project, we almost would have had to have a translator walking around with them. That was not the case when we did our audit. …We were able to get our ISO9001 certification."

"A number of people from the program have been promoted…..So we took two of these people, obviously, and put them on a million dollar piece of equipment and said,

it's yours, run it, and they have done a fabulous job. I mean they are both wonderful people, They really care and obviously, they have got initiative, and one of the nice things about ESL classes also is , it gives you an opportunity to see where the initiative was in the building because these are people that were willing to give up personal time every single week."

"It's hard to imagine how difficult it must be to be in an environment where you can only talk to twenty or thirty of all the people in the whole place because those are the only people that speak your language. It has to be incredibly difficult."

"During graduation I saw her stand up in front of a whole groups of strangers and give a speech which for her was in a foreign language….and so when …said she is interested in the job, I said let's give it a try.and it was purely because of the class. ..and she has done a great job

"This group has initiative and therefore, when an opening occurs they get the opportunity."

"It is impossible to quantify (the money saved) If we were not convinced that this was a good thing for the business, do you think we would be doing it now that we are having to pay? Hey we have been sold. The benefits are real."

NIDEC/POWER GENERAL

ATTACHMENTS:

- *Course Enrollment Statistics*
- *Pre- and Post-Assessment Tools*

Power General/Nidec

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ADP*

Course Title	*Number Enrolled*
CAN Life Emp Wkshop 1	4
CAN Reading/Writing 1	4
CAN Math/Science 1	4
CAN Life Emp Wkshop 2	3
CAN Math/Science 2	3
CAN Rdg/Wtg/History	3

Summary for 'Type' = ADP (6 detail records)

Sum *21*

Type *ESL*

Course Title	*Number Enrolled*
ESL Power General 1996	15
Reading/Writing Power General	13
PG LangProfSkills01	12
PG LangProfSkills 02	12
PG English Prof Skills 01	11
PG English Prof Skills	11
English Prof Skills Cont.	13
Reading And Writing Basic	13

Summary for 'Type' = ESL (8 detail records)

Sum *100*

Summary for 'Program/Contract' = Global 2000 (14 detail records)

Sum *121*

Program/Contract **Private Sector**

Type *ESL*

Course Title	*Number Enrolled*
ESL-Beginning	13
Reading and Writing and Work	18

Summary for 'Type' = ESL (2 detail records)

Sum *31*

Summary for 'Program/Contract' = Private Sector (2 detail records)

Sum *31*

Summary for 'Company' = Power General/Nidec (16 detail records)

Sum *152*

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GLOBAL 2000
NATIONAL WORKPLACE LITERACY PROGRAM

CONTINUING
EDUCATION
INSTITUTE INC.

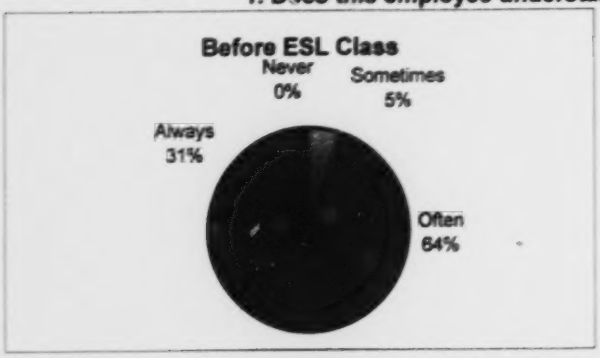
Pre- and Post-Assessment Tools:
NIDEC/Power General

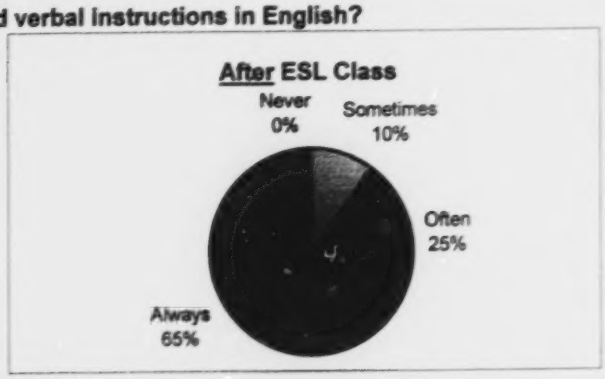
Continuing Education Institute's Workplace Education Assessment Results

Supervisors' Surveys: Performance of Employee/Participants in English as a Second Language Program

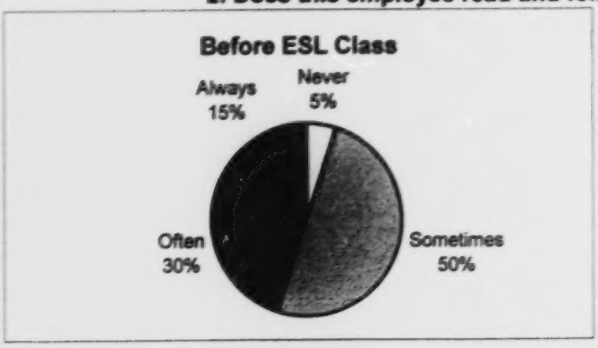
Company: NIDEC/Power General ***June 1997*** ***20 Employees Assessed***

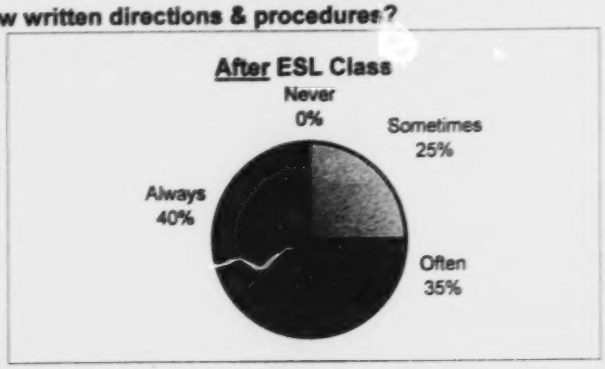
1. Does this employee understand verbal instructions in English?



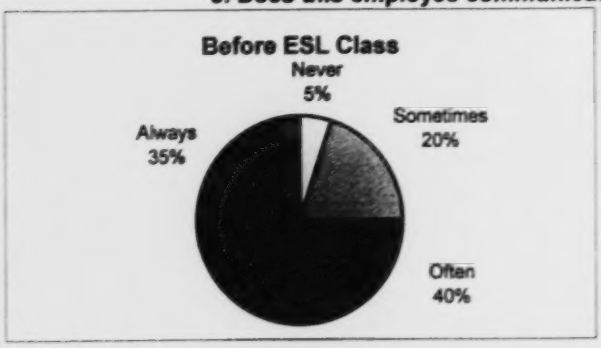


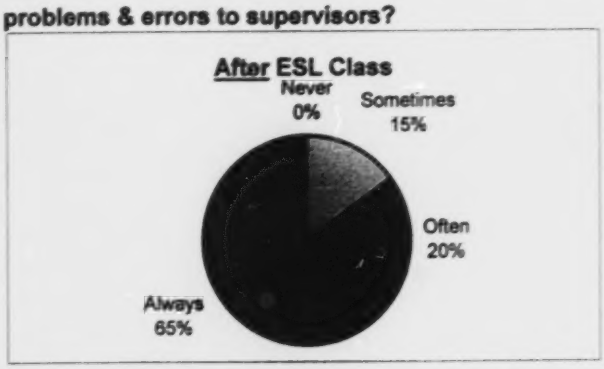
2. Does this employee read and follow written directions & procedures?



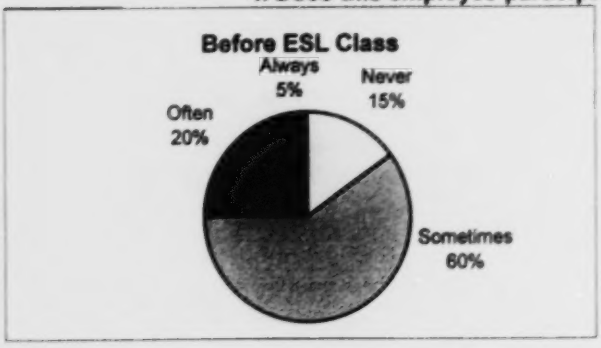


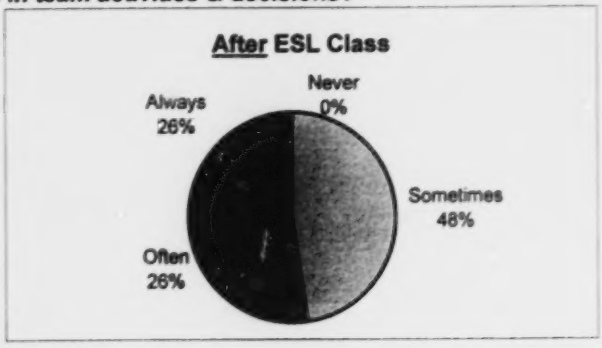
3. Does this employee communicate problems & errors to supervisors?





4. Does this employee participate in team activities & decisions?



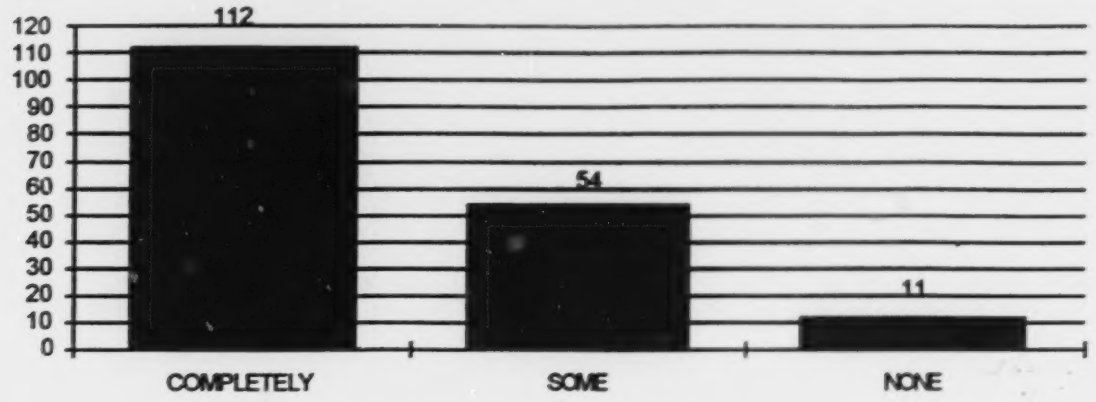


GLOBAL 2000 QUESTIONAIRE

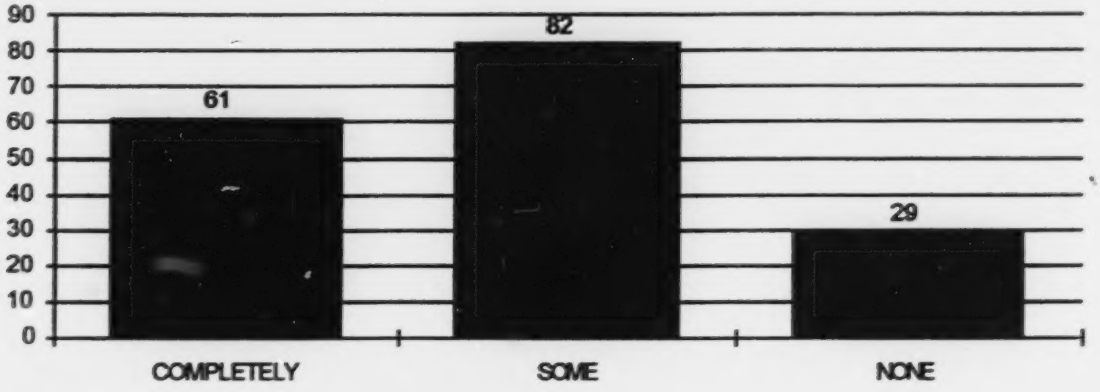
UNDERSTANDS ENGLISH		WRITES ENGLISH		MATH ADD, SUB,MULT&DIV	
COMPLETELY	112	COMPLETELY	61	COMPLETELY	137
SOME	54	SOME	82	SOME	29
NONE	11	NONE	29	NONE	10
SPEAKS ENGLISH		**READS ENGLISH**		**MATH DEC.&FRACTIONS**	
COMPLETELY	109	COMPLETELY	70	COMPLETELY	68
SOME	55	SOME	74	SOME	64
NONE	14	NONE	28	NONE	30
				USE OF CALCULATOR	
				YES	150
				NO	12

R.A. 2/16/95

UNDERSTANDS ENGLISH

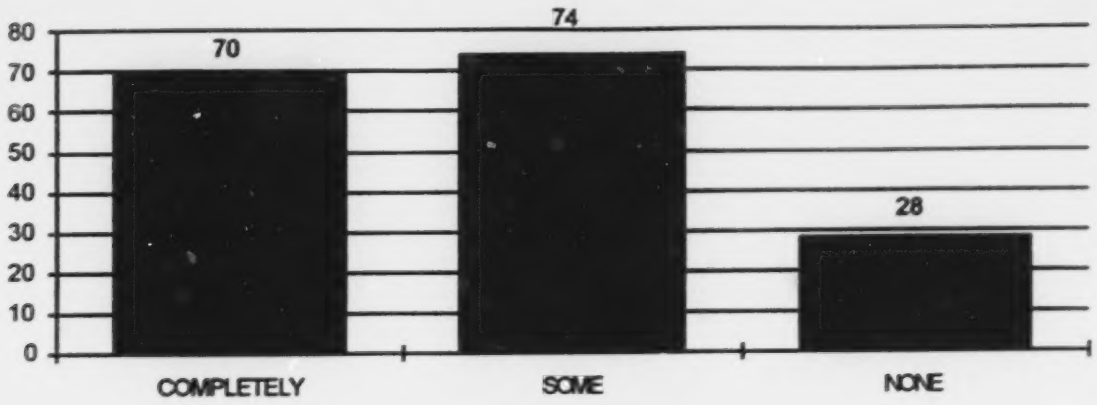


WRITES ENGLISH

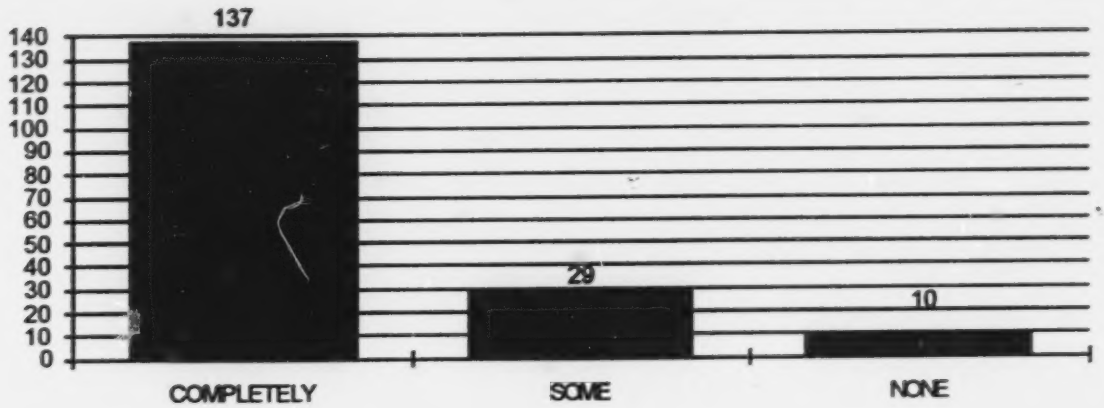


SPEAKS ENGLISH

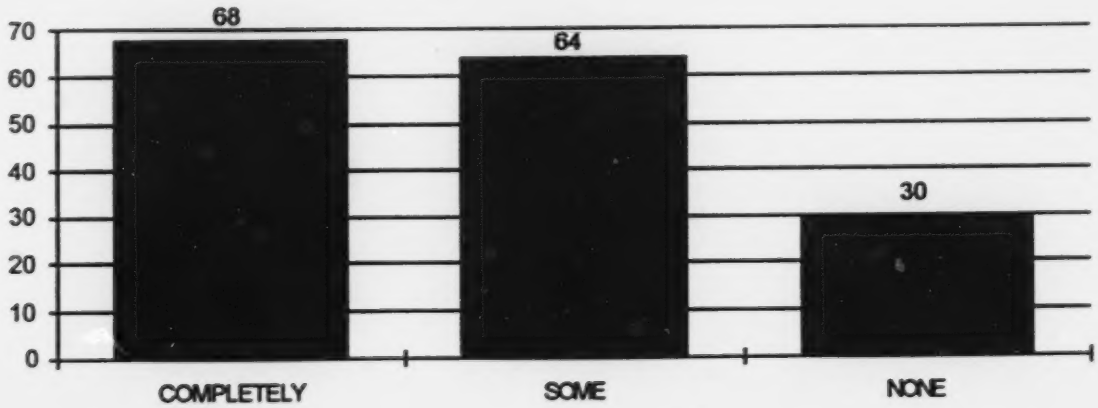
READS ENGLISH



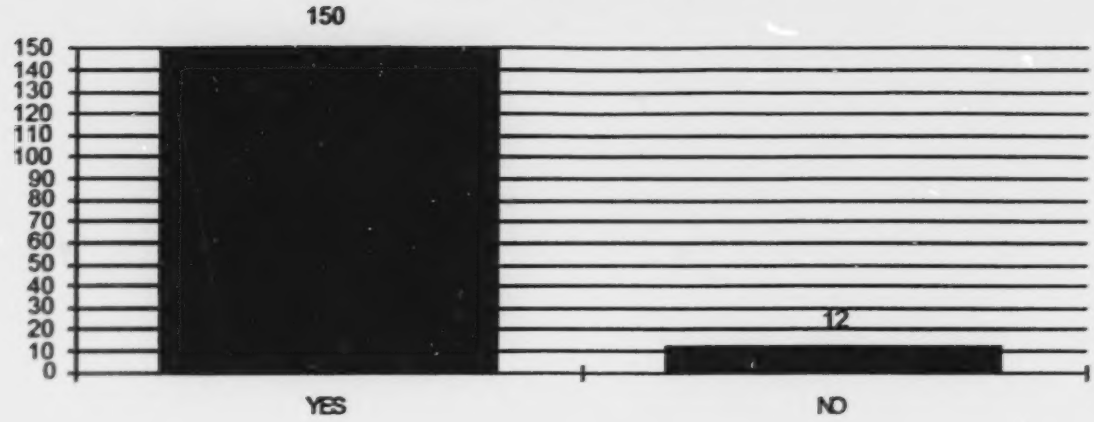
MATH ADD,SUB,MULT&DIV.



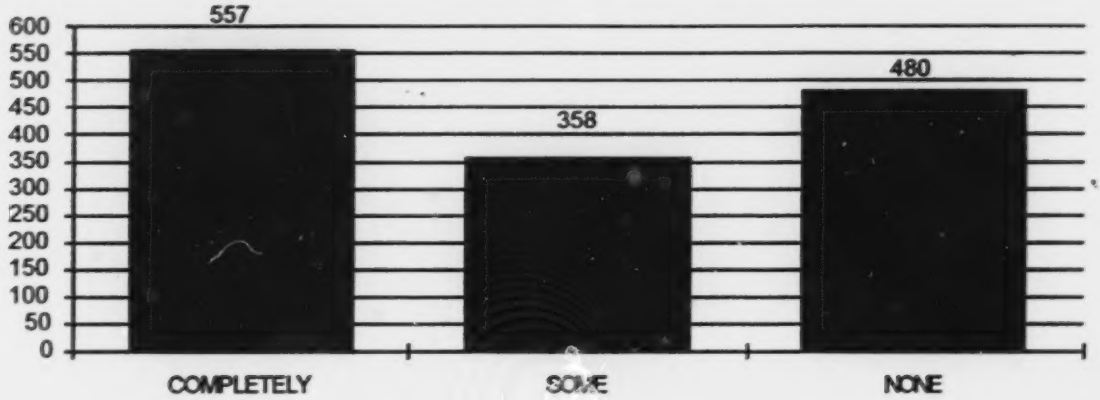
MATH DEC. & FRACTIONS



USE OF CALCULATOR



TOTAL OF ALL CATEGORIES



Words | Phrases | 03/31/95

Accuracy
AMPS
applications
Assembler
availability
auditing
capacity
Capacitor
Clockwise
connector
core
cover
descriptions
Diodes
Diviation
Dimensions
discrepancy
Evaluations
Fractions
Hipot / Hypot
Impellor
inches
inductor
Insulator
Inventory
Laminated
Molex
Mylar
Panduit
polarity
priority
Product
Reduction
Requirements
Resistance
Resistor
Rivet
Rotor
Screw
Silk-screen
Shaft
Shortage
Shroud
Spacer
Specifications
Stator
Stockroom
Technician
Terminal
transactions
Transformers
Transistors
Volts
WIND

American Wire Gauge (AWG)
AMP Co.
Assembly Leads
Bill of Material (BOM)
Burn-in
component names
component values
control board
Corrective action
Counter Clockwise
Cycle counting
Cycle time
due dates
Engineering Change order (ECO)
Functional troubleshooting
Ground continuity
Heatsink
Hot-melt
Impellor insert
In-depth analysis
Inventory reduction
Machine operator
Mechanical Assembler
Molded PC Board
Part Number
PC Board
Pounds per Square Inch (PSI)
Power Supply
production schedule
Product specification
Technical difficulties
Visual aids

ESL SUPERVISOR QUESTIONNAIRE

Employee: _____ Date: _____

Please circle one "X" for each question.	Always	Often	Some-times	Never
Does this employee:				
1. Understand verbal instructions in English?	X	X	X	X
2. Read and follow written directions/procedures in English?	X	X	X	X
3. Carry on a conversation in English?	X	X	X	X
4. Communicate with employees who speak only English?	X	X	X	X
5. Need to have information translated into his/her own language or instructions repeated to insure understanding?	X	X	X	X
6. Communicate problems/errors/defects to supervisor?	X	X	X	X
In English?	X	X	X	X
7. Suggest improvements or better ways to do things?	X	X	X	X
8. Make errors because he/she doesn't fully understand English (written or spoken)?	X	X	X	X
9. Participate in group or team activities or decisions?	X	X	X	X

10. Has there been any improvement in his/her job performance due to improved English skills? YES NO

What improvements: _____

_____

_____

_____

Continuing Education Institute

ESL Second Survey Results:
Employee-Students and their Supervisors

Organization: NIDEC/Power General

Date: March 4, 1997

Comments by Supervisors

- Her communication skills have improved a lot. She tends to talk for herself more now, whereas before she would ask someone to translate for her. *[Maria Cardosa]*

- As a result of her improved verbal and written skills she is able to communicate better with supervisor, with no need of any translation. She is also able to read any written instructions, as a result of going to school. *[Benvinda DaSilva]*

- Communication in general has improved. He only wants me to speak to him in English and he always talks back to me in English. *[Joe DeSousa]*

- Li impressively shows her great improvement in verbal skill. She now communicates well with supervisor, group leader and co-worker. *[Hong Li]*

- Maria shows an improvement in her job performance. She feels comfortable to read the paperwork and make no mistake. *[Maria Pimentel]*

- As a result of going to class she has a lot more confidence in herself and speaks a lot more and has no problem speaking English with anyone. *[Marie Soares]*

- I have noticed a great deal of improvement in her. She is able to communicate very well in English, needs no translation made. *[Luisa Camara]*

- Now, Maria can obtain the information from the bill of material and related prints by herself. Teamwork has been improved a lot due to better communication. [Maria Revera]

- Kimmie now has the ability to collect information from the bill of material, deviations and related prints which used to be provided by me. [Hua Kim Tsan]

Comments by Students

- I learned more English in this ESL class, and I got a better job in this company. It's helping me to read the Folders. *[Sanh Dang]*

- I now can communicate efficiently with my co-worker. Now, I know more English words and speak clearly, after I have taken ESL class. I hope in the future, CEI, the government and the company open more of the ESL classes. Most of my co-workers and I think this ESL program is very helpful to us. *[Lily Huynh]*

- I communicate better with my supervisor and my co-worker. I understand English better and I can read more English newspapers. I can write better sentences. *[Xay Thuong]*

- When I have any problems with my job, I tell any supervisor, he understands me better. The notes I'm writing more correctly. I can now write without a lot of mistakes. *[Nguyet Kim Tran]*

ESL SECOND SURVEY RESULTS: EMPLOYEE-STUDENTS AND THEIR SUPERVISORS

Organization: NIDEC/Power General

Date: March 4, 1997

A = Always
O = Often
S = Sometimes
N = Never

Stu = Student's response
Sup = Supervisor's response

Student #:	1		2		3		4		5		6		7		8		9		10	
Questions: Does this employee. . . Respondent:	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup
1. Understand verbal instructions in English?	A	A	A	A	A	O	S	O	A	A	O	O	O	O	O	O	O	O	A	O
2. Read and follow written directions/procedures in English?	A	A	O	A	O	S	S	S	O	S	O	O	O	O	S	O	A	O	A	S
3. Carry on a conversation in English?	S	A	O	A	A	O	S	S	A	O	S	O	O	O	S	O	O	S	A	O
4. Communicate with employees who speak only English?	N	A	A	A	A	S	S	O	A	O	O	A	S	O	S	O	A	O	A	O
5. Need to have information translated into his/her own language or instructions repeated to ensure understanding?	N	N	N	N	N	N	S	S	N	N	O	S	S	S	S	S	O	S	N	N
6a. Communicate problems/errors/defects to supervisors?	A	S	A	O	A	O	S	O	S	S	A	O	A	A	A	O	A	O	A	A
6b. In English?	N	S	A	A	A	A	S	O	S	A	A	A	-	S	S	O	A	S	A	A
7. Suggest improvements or better ways to do things?	S	S	O	S	A	S	-	S	O	S	S	O	A	A	S	S	O	S	A	S
8. Make errors because he/she doesn't fully understand English (written or spoken)?	N	N	N	N	N	N	N	N	N	N	N	N	N	N	S	N	N	S	N	N
9a. Not participate in team activities/decisions because it's hard to communicate? *(Student response)*	S		N		N		S		S		N		S		A		N		N	
9b. Participate in team activities/decisions? *(Supervisor response)*		S		S		S		S		S		O		S		S		S		S
10. *(Student only)* Since taking ESL class(es), (a) Do you think your English skills have improved?	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
(b) If yes, have your improved English skills helped you to do your job better?	Yes		Yes		Yes		Yes		Yes		Yes		Yes		-		Yes		Yes	

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ESL SECOND SURVEY RESULTS: EMPLOYEE-STUDENTS AND THEIR SUPERVISORS

Organization: NIDEC/Power General

Date: March 4, 1997

A = Always
O = Often
S = Sometimes
N = Never

Stu = Student's response
Sup = Supervisor's response

Questions: Does this employee. . .	11		12		13		14		15		16		17		18		19		20	
	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup
1. Understand verbal instructions in English?	O	A	O	O	S	O	S	A	O	A	O	A	O	A	S	S	A	A	O	O
2. Read and follow written directions/procedures in English?	O	O	O	O	O	O	S	O	O	O	S	A	O	A	O	S	A	A	O	O
3. Carry on a conversation in English?	A	A	A	A	O	S	S	S	A	O	O	A	S	O	S	S	A	A	S	S
4. Communicate with employees who speak only English?	A	A	A	A	O	O	S	O	A	A	O	A	O	A	S	S	A	A	S	S
5. Need to have information translated into his/her own language or instructions repeated to ensure understanding?	N	N	N	N	S	S	S	N	N	N	S	N	N	N	S	A	N	N	S	S
6a. Communicate problems/errors/defects to supervisors?	A	A	A	A	O	O	S	A	A	A	A	A	A	O	S	S	O	S	A	S
6b. In English?	-	A	-	-	O	A	S	-	A	A	A	A	A	A	-	S	O	S	-	O
7. Suggest improvements or better ways to do things?	A	S	-	S	S	O	-	O	O	S	S	O	O	S	S	S	S	S	N	S
8. Make errors because he/she doesn't fully understand English (written or spoken)?	N	N	N	N	S	N	N	N	N	N	N	N	N	N	S	O	N	N	N	N
9a. Not participate in team activities/decisions because it's hard to communicate? *(Student response)*	N		S		S		S		N		S		N		N		N		-	
9b. Participate in team activities/decisions? *(Supervisor response)*		S		O		S		O		S		O		S		S		S		O
10. *(Student only)* Since taking ESL class(es), (a) Do you think your English skills have improved?	Yes		-		Yes		Yes		Yes		-		Yes		Yes		Yes		-	
(b) If yes, have your improved English skills helped you to do your job better?	Yes		Yes		-		Yes		Yes		Yes		Yes		-		Yes		-	

BEST COPY AVAILABLE

ESL SECOND SURVEY RESULTS: EMPLOYEE-STUDENTS AND THEIR SUPERVISORS

Organization: NIDEC/Power General

Date: March 4, 1997

A = Always
O = Often
S = Sometimes
N = Never

Stu = Student's response
Sup = Supervisor's response

Questions: Does this employee. . .	21		22		23		24		25		26		27		28		29	
	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup
1. Understand verbal instructions in English?	O	A	S	A	S	O	S	S	A	A	O	S	S	A	S	A	S	O
2. Read and follow written directions/procedures in English?	S	O	O	O	S	S	S	S	O	O	S	S	S	A	S	O	S	O
3. Carry on a conversation in English?	O	A	O	O	-	S	S	S	A	A	O	S	O	A	S	O	O	O
4. Communicate with employees who speak only English?	O	A	S	O	O	O	S	S	A	A	O	S	O	A	O	A	O	A
5. Need to have information translated into his/her own language or instructions repeated to ensure understanding?	N	N	N	N	S	S	S	O	N	N	S	S	S	S	S	S	O	S
6a. Communicate problems/errors/defects to supervisors?	A	A	A	A	S	O	S	A	A	A	S	O	A	A	A	A	A	A
6b. In English?	-	A	A	A	S	O	-	N	A	A	S	N	A	A	A	A	S	A
7. Suggest improvements or better ways to do things?	S	S	S	O	-	O	S	A	A	S	S	S	S	A	S	S	-	N
8. Make errors because he/she doesn't fully understand English (written or spoken)?	N	N	N	-	-	N	N	S	N	N	N	N	N	N	N	N	N	S
9a. Not participate in team activities/decisions because it's hard to communicate? *(Student response)*	S		N		-		N		N		S		-		S		S	
9b. Participate in team activities/decisions? *(Supervisor response)*		S		O		O		S		S		S		A		S		S
10. *(Student only)* Since taking ESL class(es), (a) Do you think your English skills have improved?	-		-		Yes		Yes		Yes		-		Yes		-		Yes	
(b) If yes, have your improved English skills helped you to do your job better?	-		-		Yes		Yes		Yes		-		Yes		-		Yes	

BEST COPY AVAILABLE

ESL SECOND SURVEY RESULTS: EMPLOYEE-STUDENTS AND THEIR SUPERVISORS

Organization: NIDEC/Power General

Date: March 4, 1997

A = Always
O = Often
S = Sometimes
N = Never

Stu = Student's response
Sup = Supervisor's response

Questions: Does this employee. . .	30		31		32		33		34		35		36	
	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup
1. Understand verbal instructions in English?	O	O	A	A	O	O	S	O	O	O	S	O	S	A
2. Read and follow written directions/procedures in English?	O	A	A	O	S	S	O	O	O	O	S	O	O	A
3. Carry on a conversation in English?	A	O	O	O	O	O	A	O	S	S	S	S	O	A
4. Communicate with employees who speak only English?	A	A	A	O	O	O	O	A	O	S	O	O	S	A
5. Need to have information translated into his/her own language or instructions repeated to ensure understanding?	N	N	N	N	N	S	S	S	N	S	-	S	S	N
6a. Communicate problems/errors/defects to supervisors?	A	A	A	A	A	A	A	A	A	A	A	O	A	A
6b. In English?	-	A	A	A	A	O	A	A	A	A	-	A	A	A
7. Suggest improvements or better ways to do things?	-	O	O	O	O	S	S	S	A	O	S	S	O	A
8. Make errors because he/she doesn't fully understand English (written or spoken)?	N	N	N	N	N	N	S	S	N	N	N	N	S	N
9a. Not participate in team activities/decisions because it's hard to communicate? *(Student response)*	S		N		N		S		N		-		N	
9b. Participate in team activities/decisions? *(Supervisor response)*		A		S		O		S		S		N		A
10. *(Student only)* Since taking ESL class(es), (a) Do you think your English skills have improved?	Yes		Yes		Yes		Yes		-		-		Yes	
(b) If yes, have your improved English skills helped you to do your job better?	Yes		Yes		Yes		Yes		-		-		Yes	

BEST COPY AVAILABLE

ESL SECOND SURVEY RESULTS: TOTALS

Organization: NIDEC/Power General

Date: March 4, 1997

Stu = Student's response
Sup = Supervisor's response

Questions: Does this employee. . .	Always		Often		Sometimes		Never		No response	
	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup	Stu	Sup
1. Understand verbal instructions in English?	8	16	15	17	13	3	-	-	-	-
2. Read and follow written directions/procedures in English?	5	8	18	19	13	9	-	-	-	-
3. Carry on a conversation in English?	10	10	13	19	12	7	-	-	1	-
4. Communicate with employees who speak only English?	12	17	14	13	9	6	1	-	-	-
5. Need to have information translated into his/her own language or instructions repeated to ensure understanding?	-	1	3	1	15	16	17	18	1	-
6a. Communicate problems/errors/defects to supervisors?	27	20	2	11	7	5	-	-	-	-
6b. In English?	17	22	2	5	7	5	1	2	9	2
7. Suggest improvements or better ways to do things?	6	4	8	9	15	22	1	1	6	-
8. Make errors because he/she doesn't fully understand English (written or spoken)?	-	-	-	1	5	4	30	30	1	1
9a. Not participate in team activities/decisions because it's hard to communicate? *(Student response)*	1		-		14		17		4	
9b. Participate in team activities/decisions? *(Supervisor response)*		3		8		24		1		-

	Yes	No	No Response
10. *(Student only)* Since taking ESL class(es), (a) Do you think your English skills have improved?	27	0	9
(b) If yes, have your improved English skills helped you to do your job better?	26	0	10

ESL SECOND SURVEY RESULTS: SUPERVISORS ONLY (NO STUDENT RESPONSES)

Organization: NIDEC/Power General

Date: Feb. 27, 1997

A = Always
O = Often
S = Sometimes
N = Never

Stu = Student's response
Sup = Supervisor's response

Questions: Does this employee. . .	36	37	38	39	40	41	42	43	44	45	46	47	Always	Often	Sometimes	Never	No response
1. Understand verbal instructions in English?	S	A	A	A	A	O	O	S	A	A	A	O	7	3	2	-	-
2. Read and follow written directions/procedures in English?	S	A	A	-	A	O	S	S	O	A	A	O	5	3	3	-	1
3. Carry on a conversation in English?	N	A	A	A	A	O	S	S	A	A	A	S	7	1	3	1	-
4. Communicate with employees who speak only English?	S	A	A	A	A	A	S	S	A	A	A	O	8	1	3	-	-
5. Need to have information translated into his/her own language or instructions repeated to ensure understanding?	O	N	N	N	N	S	S	S	N	N	N	S	-	1	4	7	-
6a. Communicate problems/errors/defects to supervisors?	O	A	A	A	S	A	O	A	A	A	O	S	7	3	2	-	-
6b. In English?	N	A	A	-	A	A	O	N	A	A	A	A	8	1	-	2	1
7. Suggest improvements or better ways to do things?	S	A	A	A	S	S	S	O	S	O	O	N	3	3	5	1	-
8. Make errors because he/she doesn't fully understand English (written or spoken)?	S	N	N	N	N	N	S	S	N	N	N	N	-	-	3	9	-
9. Participate in team activities/decisions?	S	A	A	O	S	S	S	S	S	O	S	N	2	2	7	1	-

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Global 2000

National Workplace Literacy Partnership

Draka USA
Project Report
January - June, 1997

The Company

Draka USA is a Dutch holding company with several companies in the United States. In the *Global 2000* project, 2 sites located in Franklin, MA participated in the project. The companies in Franklin are engaged in developing and manufacturing wire cable to customer's specification. The sites have a combined workforce of 210 employees, a third of whom are non-English speakers. The goal for the partnership is to prepare employees for worldwide competition in manufacturing. Most of the non-English speakers have held no other job since settling in the area. Many of those employees have worked for the company 10 years or more and have become complacent about skills needed for the future.

Employee Involvement Team

A Training Specialist in the company spearheaded the effort to include Draka in the *Global 2000* project and was also responsible for gathering the team together. The Employee Involvement Team (EIT) included a Process Engineer, a Maintenance Mechanic, 2 Group Leaders and the Training Specialist who also served as the team's leader. The team members identified communication skills in English as the company's greatest need. Many of the non-English speaking employees had already decided they were "too old" to learn anything new, so depend on bi-lingual co-workers to translate for them. These workers also have difficulty describing problems with a machine or materials; many are inattentive to written specifications.

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In discussing communication issues that impacted the workplace, team members referred to an English as a Second Language (ESL) class that had taken place at the company the previous year which had not succeeded in improving the needed communication skills. References to the previous class permeated most discussions about how to organize the current project, such as which employees to recruit and what company needs to incorporate into the curriculum. Team members were unwilling to make decisions which might have excluded any co-workers.

CEI staff interviewed 16 candidates recruited by the team for an ESL class. Several individuals had no literacy skills and minimal communication in English. Furthermore, in addition to being "too old" to learn now, they were unwilling to commit half their own time to attend a class. At the other end of the spectrum of potential participants, many employees were quite eager to advance their skills in English. The wide spread in skill level in English as well as attitudes toward learning suggested 2 groups of very different learners comprising the participant pool. CEI staff returned to the EIT for guidance, but the team could not decide which group to enroll into a class and still be fair to all candidates. CEI, therefore, enrolled all 16 candidates into an ESL class including 3 members of the EIT. The EIT held 5 meetings during the project.

Curriculum Development

Communication skills in English were the primary focus of the curriculum for the ESL class. The instructor, herself a second-language speaker, was selected for her clear, well-defined, no-nonsense teaching style. Participants were expected to do homework in preparation for each class. They were also expected to practice pronunciation drills and relate pronouncing words to the appropriate rule.

The Employee Involvement Team put together a list of workplace vocabulary requiring the participants to confer with co-workers about definitions and workplace usage. Participants also described job tasks in sequence and learned to read the safety notices posted in their work area.

Outcomes

11 participants completed the class and received certificates in an informal ceremony. Participants spoke of their experience in the class and of the ways in which their English had improved. Several managers and supervisors spoke of changes in the use of English they had noted on the production floor and congratulated the participants.

The Employee Involvement Team had no idea how to evaluate improvement in communication skills in English. Perhaps, because half the team were also participants, they assumed improvement would be self-evident. Any discussion on the evaluation topic was met with silence.

The company has continued funding the ESL class.

EVALUATION
FOLLOW UP INTERVIEWS

Since Draka's participation in the *Global 2000* was a 15-week program of 60 hours it was very difficult to determine the gains and the ultimate benefits to the company. For this reason the follow-up interviews by CEI staff focused more on workplace needs for basic education. The Workplace Education Program of the Massachusetts Department of Education funded the workplace needs analysis.

The following topics were discussed: Draka's goals and visions; the skills employees need to help Draka meet its goals; how work instructions are communicated; how management conveys information to production workers; the level of support for educational programs; the impact of educational programs; and the strategies for implementing educational programs. Interviews, focus groups and surveys were used to answer these questions. Among the findings were:

1. The ability of machine operators to understand and follow specs (the documents that list customer instructions for each order) is the cornerstone of production. To understand and communicate about the specs the operators must

read and write accurately. Based on the specs the operators order raw materials, read technical manuals, and perform in-process quality inspections. When operators misread specs, materials are wasted and Draka loses time and money.

2. Oral communication in English is also necessary as indicated by the following quotations: "When I first came and started here it was hard to deal with the language barriers. I was trained on my machine by someone I couldn't understand, and I learned by watching, and by getting it explained to me. Copying what you see without an explanation, is not always going to teach you the right way to do it."
"It's harder for non-native English speakers to pass on information at shift change."
A supervisor observed that employees who had taken ESL classes have shown increased participation in monthly safety meetings. "People whose English is not good tend not to participate on the teams and committees that are an integral part of Draka."
"I use a lot of hand signals to communicate on the floor."
"I've adapted to the language barrier here. Everyone here is just used to it because it's the way it's always been, but it's not a great situation."

3. The survey showed that 40% of respondents said they would like to take a math review class and 97% wanted to take a computer course.

4. The employees view the classes as a benefit and appreciate the fact that they are being held.

5. There is a feeling that more support from managers and supervisors is necessary. "There is no visible management support aside from posting on the bulletin board." Some interviewees said managers will actively oppose class participation if they believe it gets in the way of production. "Managers and supervisors don't realize how critical their support can be. Right now they are the stumbling block."

Draka has for many years adapted the communication necessary for training, production and safety to the limited English and literacy abilities of many workers. Thus there is an air of complacency about how things currently work. Few employees realize that – while there may not be glaring problems associated with limited basic skills in the workplace – production, quality and participation could improve greatly through education. Draka could see:

- increased operator responsibility for fulfilling customer orders as specified;
- less time spent by supervisors and co-workers translating and adapting procedures;
- fewer production errors leading to scrap and lost time;
- more efficient problem-solving;
- more and higher quality communication within departments and across shifts;
- better understanding of safety procedures;
- more participation on improvement project teams and TQM initiatives;
- greater involvement in monthly and quarterly meetings.

With this clear relationship between employee education and company goals in mind, Draka's managers and supervisors can play a stronger role in encouraging and supporting employee participation in basic skills programs. The idea that support

can be "passive" should be discarded. Managers and supervisors can take the following steps:

- articulate the desire for more participation;
- articulate reasons why classes are important, in both business and personal terms;
- announce class opportunities at meetings, and have follow-up discussions;
- make improving English a Performance Review goal
- show interest in and acknowledge employee/participant achievements.

Based on the findings of this WNA project, the EIT can take the following next steps:

- discuss the issues outlined in this report;
- plan strategies for addressing the issues and a timeline for the plan;
- decide to whom, how and when to present the findings of this report;
- plan a campaign to increase manager and supervisor buy-in to workplace education;
- schedule and recruit for classes.

Global 2000

National Workplace Literacy Partnership

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Project Report
January - June, 1997

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- schedule and recruit for classes.

DRAKA USA

ATTACHMENTS:

- *Course Enrollment Statistics*

Draka USA

Course Enrollment Statistics

Program/Contract **DOE Workplace Ed**

Type *ABE*

Course Title	*Number Enrolled*
Math	1
Computer Writing Class/B	1
Computer Writing Class	5
Computer Writing Class	3

Summary for 'Type' = ABE (4 detail records)

Sum *10*

Summary for 'Program/Contract' = DOE Workplace Ed (4 detail records)

Sum *10*

Program/Contract **Private Sector**

Type *ESL*

Course Title	*Number Enrolled*
ESL	1

Summary for 'Type' = ESL (1 detail record)

Sum *1*

Summary for 'Program/Contract' = Private Sector (1 detail record)

Sum *1*

Summary for 'Company' = Draka USA (5 detail records)

Sum *11*

Global 2000
National Workplace Literacy Partnership

Pillsbury/Rudi Foods
Project Report
July, 1997 - February, 1998

The Company
The Pillsbury Company in Chelsea, MA bakes bread and rolls, employing approximately 200 people. The Chelsea plant was acquired by Pillsbury, a Minneapolis, MN-based company in 1994, and, in many respects, continues to struggle with changing from a small, everyone-does-every-job-type of business to a highly structured large company.

The baking operation is divided into 3 main areas: mixing ingredients, baking and cooling the products and, finally, packaging and preparing the finished products for shipping. Other employees maintain equipment and product sanitation requirements throughout the plant. Employees, covering 3 shifts, need to be able to accomplish the following tasks: read recipes, job orders, procedures, signs, and labels; communicate with co-workers and management personnel; maintain daily event logs and write incident reports. Most of the employees are non-native English speakers.

Employee Involvement Team
The Pillsbury production manager and Human Resources administrator organized an Employee Involvement Team to work with CEI staff to determine company educational needs and recruitment strategies; to monitor class progress; and to evaluate the project. Team members included a shipping/receiving employee; 2 maintenance employees, 2 production employees, 1 production supervisor, 1 production manager

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and 1 HR administrator. The team held 5 meetings, each an hour and a half.

Due to the preponderance of limited English proficient employees, the team decided that improving their communication skills in English was the greatest need. As the team demonstrated knowledge of co-workers' educational needs as well as the intricacies of their schedules and likelihood of their completing the training, an educational Needs Assessment seemed unnecessary. Instead the team put together a list of 42 likely candidates for an English as a Second Language (ESL) class and then whittled the list down to 20 co-workers to recruit into the class. Team members then determined which member would talk to which co-worker about enrolling in the class. 15 employees, including 3 team members, were summarily signed up. CEI staff interviewed the individuals on the pared-down list of 20 to arrive at the maximum number of 15 for the class. For the most part, the 5 individuals who were not included were counseled to seek more advanced classes.

The Employee Involvement Team never determined how it would evaluate participants' improvements to their communication skills in English; the concept of evaluation was not within the team's expertise. Most of the meeting times were concerned with the logistics of organizing the class and gathering feedback about the class from the participants. Those team members, who were also participants, were encouraged to speak with the instructor about their own and other participant's individual learning issues.

Communication Skills Curriculum

The class met for two hours twice a week for 15 weeks, a total of 60 hours of instruction. All 15 participants were males and represented all the work areas and shifts. Several 3rd shift participants came to the plant specifically for the class.

Curriculum focused on pronunciation strategies, conversation, idioms, grammar, document literacy and writing. The workplace content of the curriculum was developed from the participants' work areas, i.e., mixing, baking, shipping and sanitation/maintenance. For example, participants

studied the formatting and sequencing vocabulary in various process descriptions. They also examined a variety of forms in order to know what information was being requested and where to put it. Participants requested assistance with their various writing needs on-the-job. They brought incident report forms to class, and the Human Resources provided company documents and sample daily log entries.

Outcomes

12 out of 15 participants completed the program. While the EIT did not collect any data for evaluating the class, CEI staff spoke with the Production Manager and supervisors not enrolled in the class. They reported that many of the participants' communication skills had improved "noticeably." They singled out several participants who, in their estimation, were "taking the class seriously and making good progress."

The company provided refreshments for the participants' last class. Participants spoke about their experience in the class, and of the ways in which the class had helped them at work to write coherent entries in the logbook, to write messages to and speak English with co-workers. Participants completing the class received certificates.

PILLSBURY/RUDI FOODS

ATTACHMENTS:

- *Course Enrollment Statistics*

rudi Foods

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ESL*

Course Title	*Number Enrolled*
Rudi's Foods ESL	14

Summary for 'Type' = ESL (1 detail record)

Sum *14*

Summary for 'Program/Contract' = Global 2000 (1 detail record)

Sum *14*

Summary for 'Company' = rudi Foods (1 detail record)

Sum *14*

Global 2000

National Workplace Literacy Partnership

M/A Com
Project Report
March - December, 1997

The M/Acom Company – Lowell, MA March - June, 1997

M/A Com produces telecommunication products in 5 plants in Massachusetts; the corporate offices are located in Lowell, MA. The company employs approximately 300 workers, a third of whom are non-native English speakers. In CEI's original planning discussions with the company, a Boston-area plant was selected for the educational collaboration.

Because of the highly technical and competitive nature of the telecommunication business, M/A Com has developed a range of educational and technical training courses for employees. Courses are, for the most part, taught on company time by consultants. Employees enrolled in classes outside their work site are also given company time for traveling to and from their classes.

Initially, to minimize the travel time of four employees enrolled in an English as a Second Language (ESL) class, the company decided to change the location of the *Global 2000* educational training to the participants' work site, a plant in Amesbury some distance outside Boston. CEI staff indicated that 4 employees in that plant were not a large enough group for a class. However, the training manager thought the plant could recruit another 4 to 6 employees to bring the total to 8 - 10 participants.

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Employee Involvement Team

The Amesbury plant has approximately 185 employees, a quarter of whom work a second shift. An Employee Involvement Team (EIT) was assembled which consisted of 2 supervisors, a Personnel administrator who was new to the job and the corporate Training and Development manager. As the EIT model included additional non-exempt workers, CEI requested that these members be recruited, but the project was transferred to another site before these members were added. The EIT met four times and discussed the language and literacy needs of their limited-English speaking employees, concluding that being able to leave the employees alone and unsupervised, especially during the second shift, was their greatest need, thereby requiring that the employees be able to read and follow procedures correctly.

CEI staff interviewed only 6 candidates; since other non-English speakers did not choose to participate. The team also explored the possibility of broadening the course topic to include anyone needing to improve their reading skills, but no additional candidates came forward. CEI requested that M/A Com then select another location for the project that would encompass a larger employee pool. Therefore, the company agreed to conduct the project at one of its Waltham plants.

M/A Com - Waltham July - December, 1997

The Employee Involvement Team (EIT) organized for the *Global 2000* project at the Waltham plant included a new Personnel assistant assigned to lead the team, the T&D manager's assistant, 3 supervisors and 2 non-exempt employees. One team member was also a class participant and, when classes started, dropped from the team. The team held approximately 11 meetings.

The team's first activity was to orchestrate a group of volunteer tutors to support the learning effort of employee/participants within the company. The team then explored a variety of educational needs for the class to address, including 1. reading all the informational materials sent out from the corporate offices; 2. reading and comprehending procedures, 3. reading safety

procedures –especially those pertaining to chemicals used in many processes; 4. understanding what was said at company meetings; and 5.asking questions and becoming integrated into the American work culture.

The team never really determined where, exactly, to focus its educational goals nor how to collect the data to measure the attainment of those goals. Instead, each of the three supervisors initiated their own activities transferring classroom instruction to work-related projects for those employee/participants from their particular department. For example, in one department, the supervisor had his employees read each new procedure aloud to him and explain to him what each step involved. Another supervisor began expecting his employee/participants to speak up at department meetings.

Curriculum Development

CEI staff interviewed each candidate for the class, and because reading comprehension seemed a common need for employees, asked each candidate to read and answer questions about the company's badge requirements. A few could explain the requirements after reading the instructions, but most only recognized the $5 fee needed for a replacement badge and spoke about that requirement. Several could not read anything in English. The interviewing process revealed a wide spread in English language and literacy abilities among the participants.

To minimize the disparities in educational level in the classroom, CEI provided a staff member in addition to the instructor to work with the pre-literacy participants on pronunciation and basic reading strategies in English. CEI also met with the volunteer tutors signed up by the EIT and provided them with information and encouragement for expanding their participants use of English at work.

The curriculum focus for the larger group was on increasing their reading comprehension and vocabulary development in English. Participants from each department were asked to bring in procedures being used in their area

and vocabulary for reporting defective materials. Class times were frequently shifted or delayed to accommodate company-wide information sessions. These sessions were also incorporated into the curriculum giving participants instruction and practice in summarizing, in asking questions and in expanding their understanding of company activities based on the meeting agenda.

As the class progressed, the more advanced participants were given more challenging reading and reporting assignments. Giving a summary of a written account or an experience became an activity in which everyone eventually participated, making for a very lively class. Participants were also instructed in question formation and encouraged to practice asking them while at work. Initially, participants asked questions about points of grammar in English and then moved on to asking about broader issues.

Outcomes

M/A Com's policy for class completion was that participants would need to attend a minimum of half the classes: in this instance, participants needed to attend 15 of 30 classes. Of the 15 participants in the *Global 2000* ESL class, 12 of them received certificates, many attending all 30 classes. Each participant wrote of personal experiences when they first arrived in the U.S. with no ability to speak or understand English. These accounts were compiled into a booklet and distributed to the authors and guests. All participants gave short speeches during a classroom ceremony.

Supervisor/team members noted the progress their employee/participants made during the program especially in the area of demonstrating more confidence in solving problems at work. One supervisor reported that 2 of his employee/participants had given presentations at a company-wide meeting and done very well. Another supervisor noted that he had an understandable conversation with one of the participants who had previously only whispered words when asked a question. Although many of the student/participants and members of the EIT wanted the classes to continue, the management chose to continue with an earlier program because of cost.

M/A COM

ATTACHMENTS:

- *Course Enrollment Statistics*

M/ACOM

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ESL*

Course Title	*Number Enrolled*
Workplace Communication Skil	15

Summary for 'Type' = ESL (1 detail record)

Sum 15

Summary for 'Program/Contract' = Global 2000 (1 detail record)

Sum 15

Summary for 'Company' = M/ACOM (1 detail record)

Sum 15

Global 2000

National Workplace Literacy Partnership
Spir-it, Inc.
Project Report
July, 1997 - February, 1998

The Company

Spir-it, Inc., located in Wakefield, MA, manufactures swizzle sticks, stirrers and decorative picks. The company employs 115 workers over 3 shifts in its extrusion, molding and shipping operation. Many of the employees are non-English speakers and, due to working schedules, few are able to attend English classes in the community.

The goal for Spir-it, Inc. in participating in the *Global 2000* project was to improve the literacy level of its participants to enable them more access to the life of the company through reading memos, bulletin board notices, job orders, and safety signs.

Employee Involvement Team

The Employee Involvement Team (EIT) for the project was made up of the Human Resources Manager, the Molding Department Manager, a supervisor, a trainer and an employee/participant. The team met four times, most meetings lasting an hour. While the team supported the goal of increased literacy in English, they particularly wanted to include better communication around problems of production quality and keeping more accurate records of production time/yields and down time.

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The team decided as its main objective to focus on the measurable improvements in employee/participant's record-keeping. The goal in an English as a Second Language (ESL) class was to understand and apply the basic math functions, necessary for the record-keeping process.

Recruitment

The Human Resources manager selected and recruited the employee/participants for a 15-week/60 hours ESL class, and CEI staff interviewed 9 employees individually. 3 of the 9 had little or no literacy in their own language, and one had never been inside a schoolroom. The remaining candidates ranged from beginners to advanced learners. CEI staff requested more potential candidates for the class because of the inherent difficulties in conducting a class with such disparate levels of learners. The pre-literacy participants needed a slow and patient pace with continuous repetition while the advanced learners expected to be challenged at a faster pace. The request for additional candidates for the class was made numerous times to the HR manager and to the team, but the group of 8 participants remained essentially the same; the employee who had never been to school in his country never made it to the ESL class either.

Curriculum Development

Curriculum Development in a multi-level ESL class is, by definition, challenging. Every lesson needs to be designed to meet disparate needs, and each learner needs to succeed at something. At Spir-it, Inc. advanced participants did assist and encourage the pre-literacy learners to every extent possible while trying to be diplomatic about helping a co-worker. The curriculum focused on pronunciation and listening skills, on conversation, on forming questions, basic grammar, vocabulary development and basic math functions with emphasis on multiplication and decimals. The workplace component of the curriculum relied on company materials such as memos, bulletin board postings, safety instructions, including locations for fire exits and extinguishers, job orders, and vocabulary for rejects and describing machine problems.

Because of the wide range in language and literacy levels, CEI asked the HR manager and the team for volunteer tutors from the company. The supervisor on the team agreed to work with one of the participants but after a few sessions became too involved in his own work to continue; no other employees came forward.

5 of the 8 employees enrolled in the class completed it. The advanced level participants were counseled to apply to a community college for further course work.

Outcomes

All the participants in the 15-week class improved their speaking, understanding and literacy skills in English. Even more noticeable was their confidence in their ability to relate to others in English. Team members who worked in production commented on the improvement in the participants' English skills. Two participants were promoted toward the end of the 15 weeks, in part due to their improved record-keeping skills.

At the conclusion of the 15-week class, the team planned a pizza lunch and ceremony in recognition of the employee/participants' efforts. As the date approached, several participants expressed a preference for Chinese food instead of pizza. One participant was prevailed upon to call the HR Manager and express the class' menu choice which was accomplished successfully and clearly in English.

The President of Spir-it, Inc. , the Employee Involvement Team, CEI staff and participants gathered in the company conference and class room and celebrated the achievements of the participants. A representative from the local newspaper also recorded the event. (See the article attached)

Throughout the partnership with the company and its EIT, everyone was very supportive of the learners. The question as to why there were so few participants was never answered. The company has expressed interest in continuing the class, but to-date has not done so.

SPIR-IT, INC.

ATTACHMENTS:

- *Course Enrollment Statistics*

Spir-it

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ESL*

Course Title	*Number Enrolled*
Spiritual	7

Summary for 'Type' = ESL (1 detail record)

Sum 7

Summary for 'Program/Contract' = Global 2000 (1 detail record)

Sum 7

Summary for 'Company' = Spir-it (1 detail record)

Sum 7

Global 2000

National Workplace Literacy Partnership

Parker-Chomerics
Project Report
February - June, 1997

The Company

Parker-Chomerics, a division of the Parker-Hannifin Corporation, is located in Woburn, MA. The company is divided into supporting business units, such as Molding, Choforms, Compounds and Metals to design, develop and manufacture a variety of sealant and gasket products. The division has approximately 425 employees, an increasing number of whom are non-English speakers. All the business units have non-English speaking workers, but the largest concentration of them work as assemblers and machine operators in the Molding and Choform units.

Employee Involvement Team

Employee Involvement Team (EIT) members were recruited by the company's Human Resources Manager and an HR trainer who also acted as team leaders. In addition to the HR members, the team was comprised of supervisors from the Molding and Choform Business Units, a technician, and 2 hourly non-native English speaking workers.

The EIT identified the educational training needs for the company as improved communication in English such as, for example, passing on information from one shift to the next, explaining to co-workers what you are doing, explaining problems with machines and materials to supervisors, etc. Employees also need to

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be able to fill out requisition forms and sign-off on the job order as it progressed through the manufacturing process. However, what the team didn't know was the interest level among employees for training. The team, therefore, designed and distributed a survey among manufacturing employees for their level of interest in English as a Second Language (ESL), Reading Comprehension, Math and Business Writing. Even though the greatest response was for Business Writing, seconded by ESL, the team thought the company would be best served by offering ESL

The team requested a list of potential candidates for an ESL class from each business unit. Then CEI staff interviewed 20 non-English speaking candidates, 15 of whom were enrolled into the ESL class. Those not enrolled were more advanced and counseled about alternative classes.

The team held approximately 9 meetings over the life of the project. Two of the team members also served as tutors in the ESL class.

Curriculum Development

The curriculum for the ESL class focused on the company's need for better communication. English pronunciation and practice drills were conducted throughout the 15-week class. Participants memorized particular phrases that served as models for clear, distinct speech. Participants continually worked to improve their reading comprehension and basic grammar skills in English. A couple of participants were non-literate in their own language and in English, so the two bi-lingual EIT members were recruited to give these participants extra assistance.

As the company traditionally includes its employees in most aspects of the business, "Target" training sessions are held regularly to explain company values and projects to employees; employees attend monthly and quarterly meetings as well. To help the employee/participants understand more of what is said in these meetings, the ESL curriculum included a lot of company material and specialized vocabulary. The challenge was to make such concepts as integrity, core values, dignity, pride in pursuit of customer service, continuous improvement, etc.

comprehensible and usable at work and in participants' lives. Although the EIT had identified additional company documents such as policy and benefit plans to be included in the curriculum, since class time was limited, the goal of including employee/participants in these company activities seemed the most important.

Outcomes

The EIT could not decide how it wanted to evaluate its goals for the project. The team did make improving communication its main goal for the project, so when it came to determining a way to measure improved communication, the team looked to its 2 supervisors who had the most contact with the employee/participants. Rather than a formal assessment, the 2 supervisors gave their impressions of how their employees had progressed. The main improvement, according to each supervisor, had occurred in increased confidence. Employees were now more willing to speak up and ask questions. Many participants were making an effort to keep the next shift's employees apprised of problems with machines and other issues.

12 out of the 15 employees enrolled into the *Global 2000* ESL class completed it and received certificates in a concluding ceremony. In anticipation of the event, participants prepared and practiced brief speeches about their experiences as immigrants and employees at Parker-Chomerics. Several talked about struggling to learn English on their own while working and their gratitude to the company for providing them with the opportunity to learn English more formally. One participant's daughters and grandchildren arrived for the ceremony in a show of support; one of the granddaughters had helped grandma rehearse her speech.

The General Manager of the company further supported the participants by describing his own efforts to learn English as a student. In addition to the EIT members, staff from most of the business units were also on hand for the celebration. The entire proceeding was videotaped and for several months re-played on a large screen in the company lobby.

The company has continued supporting ESL classes by offering classes paid by the company and also establishing the CEI Adult Diploma Program in which 15 employees have enrolled with tuition fully paid by the company.

EVALUATION

FOLLOW UP INTERVIEWS

In August, 1998, the CEI Director conducted evaluative interviews with program participants. The following are some examples:

Business Unit Manager - "What we gain from offering ESL classes is a much more qualified employee that we are able to employ in the tight labor market because of the fact that other people don't see beyond the shortage of language to see a good worker, and let the language barrier get in the way…A less tangible benefit is that it also gives you employees that are a lot more motivated. It shows commitment on the part of the company. It's nice to show some sensitivity, and I believe that this program is just that, and I guess I think that the benefit is that it is the right thing to do."

"I am trying to think of people that I know, for sure, were in the English as a Second Language that are line operators… You saw we have these robots out there and to be able to run those things you need to be able to read and write English. ..People that before were only allowed to be in the assembly area, doing simple hand assembling, now run lines… There are two of them (ESL students) that are in like group leader positions that get written instructions regarding how to process, to make material, or how to inspect for something… They now fill those positions, and they have gotten promotions and raises to go along with that, and that would not have happened otherwise."

"There's two types of people that come to you with problems. Those that have a solution to the problem and want to see if the solution is going okay. "The two ESL students who got promoted have become more like the people that come to me with solutions as opposed to those that come to me with a problem and go.. In other words they are taking charge."

"I just think that the program should continue at Chomerics, and I think that it should be something that other organizations should look into, because I think that it is a great, great way to expand your labor base. It removes the barrier that not being fluent in English presents, and there's a lot of good people just can't speak English well and they are really intelligent people; and, if you give them a chance and give them the tools, they will excel."

Assembler- "Before I was afraid to talk English to the customers. When a customer came on the floor, I would go the other way. The other day a customer, Erickson, came on the factory floor and I talked to him for a long time. I answered all his questions. "

Supervisor –"Before the ESL classes 2 or 3 people were afraid to talk to George or Jim (the managers) and would go to me. Now after the classes they go to them first. Now people will work with anyone. Before they just wanted to work in their own (language/ethnic) group. People when they come to work are being trained by a woman from India or someone from Cambodia who only speak English to the new hires."

Training Manager – "Of course our need has evolved and gotten even more acute as we are taking on more and more folks into our culture whose first language is not English. So, thank G-d, we embarked on having this program here; otherwise we would not be in the good shape we are in right now."

"Not only have I heard, I have experienced people. They are much more confident. They are much more likely to, not even maintain, but establish eye contact with you, and have a conversation with you then they were before. Prior to the program I think that they were invisible in the organization, very much in the shadow, in the background, choosing not to be noticed because it was a self esteem issue, so very much their self esteem and confidence has increased."

"With the unemployment rate being so low, these are actually our very, very best workers. Some of these folk that you probably wouldn't have considered in another hiring climate are now very viable candidates, and they are very successful in their

be stuck in an entry level job. We want to be sure that they have the ability to progress."

General Manager – "The ones (companies) that are going to win the war, I would say, are the ones that are equipped with the trained employee and associates for their business. So that's in general, and of course we have got to go back and focus what kind of training and one of the areas for us has been, English as a Second Language, and also a focused training; I mean, like your diploma program. I think that's wonderful. We give the opportunity for growth for the associates and also focused on, again on the manufacturing technology rather than some academic issues."

"We decided, we realized here that there is no other option. If you want to stay in business for a long time, not a short time, than you have got to do something fundamentally right) and that's education and training. I mean that's the key. "

"What Does Good Look Like?"

PARKER-CHOMERICS

ATTACHMENTS:

- *Course Enrollment Statistics*

Parker-Chomerics

Course Enrollment Statistics

Program/Contract **Global 2000**

Type *ESL*

Course Title	*Number Enrolled*
ESL Parker-Chomerics 1997	12

Summary for 'Type' = ESL (1 detail record)

Sum *12*

Summary for 'Program/Contract' = Global 2000 (1 detail record)

Sum *12*

Program/Contract **Private Sector**

Type *ESL*

Course Title	*Number Enrolled*
ESL at Chomerics, August 5, 9	9
Beginning ESL	12
ESL Parker-Chomerics, Spring	12

Summary for 'Type' = ESL (3 detail records)

Sum *33*

Summary for 'Program/Contract' = Private Sector (3 detail records)

Sum *33*

Summary for 'Company' = Parker-Chomerics (4 detail records)

Sum *45*

III. Project Evaluations

PROGRAM EVALUATION

for

CONTINUING EDUCATION INSTITUTE'S GLOBAL 2000 PROGRAM

at

Fire Control Instruments, Power General/Nidec, Analog Devices, and Boston Scientific Corporation

Fall, 1996

by

Debra Tuler

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    Goal-setting Worksheets
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INTRODUCTION

At the request of Lloyd David and Katherine Archer, I conducted an evaluation of programs at four sites which are part of CEI's Global 2000 Program. I was not brought on as the external evaluator required by the National Workplace Literacy Program to evaluate CEI and its process in providing workplace education, but more as a local evaluator with an expertise in qualitative methods to focus on the local programs themselves. This evaluation is therefore only one piece of the evaluation work CEI is doing. The purpose of this evaluation is to improve the programs offered at these sites. In addition, the information gathered will enable CEI to move ahead with the task of further developing an evaluation component to their program development and goals-setting process. The questions guiding this research were: what was good and what could have been better about the previous year, and how can we improve services? The specific objectives were:

- to determine what teachers, students, and company personnel liked (strengths) and disliked (weaknesses) about the program
- to determine if the programs achieved their goals
- to determine whether additional goals or expectations have emerged

This report is divided into four sections. The first section describes the process used to gather information about 1) participants' perceptions of the ways in which the program has been successful so far and the ways in which services and the program can be improved, and 2) achievement of goals and extent of progress. The second section provides recommendations regarding documentation and evaluation tools developed and used by CEI. The third section provides site-specific analyses. And finally, the fourth section provides an analysis of CEI's Global 2000 project from the perspective of teachers in both the ESL and ADP programs, concerned primarily with communication within the program, curriculum, and assessment issues.

SECTION 1: PROCESS and METHODOLOGY

I conducted focus groups and interviews with members of employee involvement teams, with previous students, and with teachers for four sites in the Global 2000 project[1]. I prefer focus groups and interviews because in order to get deep information it is necessary to ask open-ended questions which people often do not answer on surveys. Also, in focus groups, a comment made by one person often triggers a comment by another person. Further, it provides me with the opportunity, not found in surveys, to ask clarification questions and confirm my understanding. The choice of focus groups or interviews fell to the contact person at each site; while I mainly used focus groups, in a couple of places they felt that interviews would be easier in terms of taking people off the production floor. At one site, Power General, they could not arrange a meeting time, so they asked me to send my interview questions; EIT members filled them out and returned them. At this site I also spoke with students one-on-one. I asked similar questions of both students and EIT members. Refer to the appendix for the interview protocols. After conducting all the interviews and focus groups, I reviewed the data to identify common themes.

In addition to speaking with students and EIT members, I interviewed both ESL and ADP instructors. I also spoke with Lloyd and Katherine early in the process, and with Kathy midway through.

Finally, I reviewed the needs assessment and evaluation documents developed and used at each site, and the information gathered through these documents. I reviewed these not to determine the quantitative results, which CEI is able to do through NWLIS and its own charts, but in order to see comments and to note the format or structure of these documents.

[1]. The sites included in the evaluation are Analog Devices, Fire Control, Power General, and Boston Scientific; AEC did not participate in the evaluation.

SECTION 2: DOCUMENTATION and EVALUATION TOOLS

The documents which I reviewed as part of the evaluation project were goals statements, needs surveys, teacher end of cycle evaluations of student progress, student end of cycle self evaluations of progress, and supervisor end of cycle evaluations. Not all sites included all documents for all cycles and classes.

Initially, my purpose for reviewing the documents was to analyze data collected for the purpose of evaluating the extent to which the projects were meeting stated goals and objectives. The questions I sought to answer were 1) did CEI's classes accomplish what they said they would? 2) how could they be improved? However, I encountered some difficulty in analyzing the documents for this purpose for the reasons indicated in the chart below. The following recommendations in the chart are intended to assist CEI in developing a more reliable accountability system.

PROGRAM EVALUATION

for

CONTINUING EDUCATION INSTITUTE'S GLOBAL 2000 PROGRAM

at

Fire Control Instruments, Power General/Nidec, Analog Devices, and Boston Scientific Corporation

Fall, 1996

by

Debra Tuler

DIFFICULTY	RECOMMENDATION
For some sites, there were student evaluations but no teacher evaluations, or vice versa (e.g. FCI). Therefore, it is not possible to compare responses; this kind of comparison (triangulation) is used in qualitative research as a way to establish validity.	Ensure that teachers and students fill out similar forms. To make comparisons among different respondent groups simple, keep items in the same order on different forms. I.e. the list of items on a needs survey should be in the same order as the list on the teacher's evaluation, the same as on the student's evaluation. If teachers respond to items that students do not (or vice versa), put those at the end of the list. Data collection forms should match the objectives to be evaluated and each other. Each item on an evaluation form should match an indicator or progress or achievement for the objectives. Make sure each item only asks one thing (avoid and/or statements because then the respondent must answer two questions in one - see supervisor questionnaire at Power General)
Many forms were not dated. Therefore I could not tell which cycle they referred to.	Date all forms. Include site name (fully written), cycle, class level, teacher's name. Each form should have a clear purpose. Give each form a name to distinguish it from others. Not all forms should be called evaluation forms; for example, rather than "ongoing evaluation", try "class log" or "assessment scores". It may help to distinguish between assessment and evaluation. According to the Department of Education, assessment refers to the process of collecting and analyzing information on student learning while evaluation refers to the process of collecting and analyzing information on a variety of aspects of a program (including assessment of learning, transfer of learning, organizational change, program processes and outcomes) to determine its value.

Forms did not match class lists (or there were no class lists). Therefore I do not know which cycles and classes they are for and if there are forms for all classes held.	
Goals statements indicate company goals but do not indicate the role the Global 2000 project plays in addressing those goals. I.e., while a company goal may be to "increase operator's abilities to read and understand operating procedures" (FCI), if no operators are enrolled in classes, the Global 2000 project should not be evaluated on whether or not operators improve their ability to read and understand procedures. Or, if a company goal is to increase productivity, there is no statement on the relationship between the basic skills program and this goal (how will improved basic skills help the company's bottom line?).	Collect data on clearly defined and articulated objectives. It may not be possible to collect data on all goals. If a company's goal is to increase productivity, the goals statement should indicate in what ways the Global 2000 project fits with that goal, and it should be evaluated on how it performs in those ways, not on improved productivity (there are other factors that contribute to productivity). The objective being evaluated should have a minimum of cause-effect relationships. I.e., we believe that when workers improve their reading skills, they can read and understand work orders/procedures. When they understand them, they make fewer errors. When workers make fewer errors, there is less waste. When there is less waste, productivity increases. (Note that this assumes that the workers in question are the ones who read the orders. It also assumes that there are no other factors impinging on whether or not they actually read something they know how to read.) Some companies keep statistics on errors and waste. Global 2000 keeps records on reading comprehension skills. As reading skills go up, do errors and waste of class participants go down? What else might contribute to errors and waste? And how is the company addressing those? The question therefore is not "What are the company's goals?", but "What are the goals for this project?" Comparative data is crucial to determining the impact of the program. FCI has collected this kind of data - perhaps they could present their methods to other sites.

Rating scales varied from form to form (e.g. evaluations at ADI had a different scale from the needs survey, so scores could not be compared).	Use the same rating scale on all forms. Rating scales should be even in number. It is best on each form to ask the respondent to rate current level of ability rather than to rate progress; by comparing pre and post survey scores, the evaluator can then determine degree of progress. If numbers go down, don't immediately assume failure; rather, look for possible reasons. For example, as students improve their skills, they become more aware of how little they know and of how many mistakes they make. They may therefore rate their skill at a lower level. It's not that their skill decreased but that their awareness increased. When you find apparent anomalies, talk to people to find out why. (another area of anomaly is students rating progress less than teachers do) Items to be rated should be written as statements (grammar and punctuation) Make sure that items to be rated can be rated with that scale rather than requiring a yes/no response.

SECTION 3: SITE-SPECIFIC EVALUATIONS

Analog Devices, Inc.

Strengths (Likes) and Weaknesses (Dislikes)

Based on the information obtained in student and team focus groups, the program at this site is well-organized. The team is strong and both team members and students were positive about the results so far. The existence of the team is seen as a strength and a sign of success. Also, students do homework, which indicates commitment; students also act as examples to others. Additional "likes" include the time of classes and the opportunity to use what they learn.

The primary concern expressed by the team was that they lacked the tools to assess people at the beginning, so they will never know the full benefit of the program. In this, managers expressed disappointment with CEI; they expected CEI to be better prepared to do initial assessments. Also, they find that since the learning curve is slow, it is difficult to assess progress. An additional concern is that the ESL teachers are not as strong as the ADP teachers. Apparently, students felt that the teacher was too mild and relaxed; they prefer someone who is more strict. They had high expectations which were not met; they did not feel challenged enough. On the other hand, because it was a multi-level class, other students were uncomfortable because it was too difficult. The team recommended that more/better testing be done initially to place people in the right class and that no one be allowed in without having been tested first (apparently some people got in without being tested).

Goal Achievement

The primary goals they identified were to get everyone in the company to read and understand job procedures and notes, and to do it right without relying on translators. To know whether they are achieving these goals, group leaders pay attention to workers' use of reading, writing, and speaking. What group leaders and team members have noticed is that "a wall came down"; that is, people from different language backgrounds speak English with each other, as do people from the same language background (rather than reverting to their native language). They sense an increased comfort level; it has become the atmosphere in the company to speak English. In addition, workers now read procedures and ask for help. They know people are reading because of the kinds of questions they ask and because they point out errors. As one student said, "I know my

progress because I know my own problems. So I can see change. Now I learned a little so I have a million questions; I notice things and want to know." These comments demonstrate that the goal of improved communication skills (from ADI's goal document) is being achieved.

From a statistical analysis of the student and teacher evaluations, I was able to determine that teachers tend to rate greater progress than the students. I was not able to determine why that is.

There was no information available on other goals indicated on the goal document, including improved productivity/employee empowerment, improved team problem solving, and improved process control. We need more information on the link between improved communication and these larger goals. Also, I am not sure what the connection is between productivity and empowerment (they are linked in one goal). The goal document should clearly spell out how the measures work (e.g., should the number of ECNs generated go up or down?)

Boston Scientific

Strengths (Likes) and Weaknesses (Dislikes)

The team is a strength of this program as well. The company finds that the model of targeting one or two departments at a time is a strength because participants get support from supervisors and co-workers while they are in class; the whole department buys into having them participate. The only dislike was that expressed by students: 15 weeks are not enough. The EIT needs to explore ways to continue supporting student learning and practice after classes are over. One possibility is mentoring/tutoring, as is done at Fire Controls. Another possibility is to set up a drop-in learning center or library where students can go on their own time. Students liked the fast pace of the classes ("no time wasted") and the talking. There were mixed feelings about the textbooks.

Goal Achievement

The goals of the program, as articulated in the team focus group, are to improve the literacy skills of employees and to help them be more participative. It is understood (or believed) that these will help the company. It is also understood that with only 15 weeks of instruction, students will not gain fluency; the team views the program as a building block. Specifically, they want increased confidence, for students to try to use English more, even after the class is over. (I did not have a goals sheet

document for Boston Scientific). In terms of improved literacy skills, according to team members, there is noticeable progress. Workers are able to point out errors in written procedures, which demonstrates that they are able to, and do, read. They also make suggestions for improvement. People involved in the program have been promoted, taken on more responsibility, and received company recognition awards. Those who have participated in the program will now leave notes for each other, which they did not do before. Note however, that the team and the company do not keep any records on these achievements. From needs survey and evaluation documents (which were not dated, so I am not sure when they refer to and which go with which), it appears that participants' ability to read and follow directions and writing of notes increased only slightly; this is not surprising given that literacy skills take a long time to develop (according to the DOE, to move from SPL level 0 to level 1 takes over 100 hours of instruction), but it does seem contrary to focus group information. The greatest increases (in the documentation) were in comfort level and in understanding verbal instructions. The increased participation in team meetings in the company is an indicator of progress for the program because students learn to speak up, do presentations, and to function as a team in class.

From the students' point view, the fact that classes run for a short period of time means that they must be very focused and that no time can be wasted. They found that in this short time, they do become more confident and they are able to better comprehend speech. However, they do not feel that they make great progress in terms of grammar, vocabulary, and writing.

Additional Goals

The team would like to mold the program more to the company. For example, they mentioned using Standard Operating Procedures as a tool for teaching English because it is important for operators to read them. But, they also mentioned that these procedures are always changing, which means that it is not necessary to teach the procedures themselves in class. In fact, if the procedures are always changing, then what is important is to develop transferable reading skills (regardless of what document/text is being read). The team also mentioned continued focus on "team", and on managing class in such a way as to promote the team concept (what it is, how it operates, the roles people play).

Power General/Nidec

Strengths (Likes) and Weaknesses (Dislikes)

At Power General there were mixed reviews about the program and about the Employee Involvement Team. Some found the team effective in its responsibilities while others felt it was not so effective. Those who considered it a strength did so because it includes people from all levels and functional areas within the company, meaning that all needs are considered and represented in goal-setting and development. Others articulated numerous challenges or weaknesses, including a lack of regularly scheduled meetings, a great difference of opinions making it hard to come to decisions, and the lack of English fluency among all members. In addition, the team is challenged by the responsibility of measuring changes in work productivity. In general, there was agreement that the team was effective in encouraging workers to sign up for class.

One person stated that it seemed like all decisions were made in advance by others so there was no real point in her participation. For example, the process of selecting participants seemed particular and pre-determined (even though recruitment was open); she did not feel that she had any input. Also, she was not clear on what was expected of the team in terms of setting goals and creating the project. Although only one person openly stated such confusion and dissatisfaction, it is possible that others feel the same way but were not open in stating it. One student and EIT member also stated that the team was good because everyone gave ideas, but when pressed also admitted that she never spoke up because "my idea is low". If a few members give the impression of having all the answers and decisions, then others may only agree or be silent. In addition, team members articulated numerous, different responsibilities; this shows that they are either unclear on what their responsibilities are (and therefore have different perceptions) or they may be overwhelmed by having too many. (Note: I did not meet with the team as a focus group because they could not all meet with me at the same time; instead, they answered open ended questions on a form).

Another strength of the program was the teachers.

Goal Achievement

Despite the mixed reviews on the functioning of the team and on evidence of changes in productivity, respondents were positive about the programs affect on participants' language skills. One supervisor wrote that for her,

evidence of progress was that a few people on her line now sometimes disagree with her; they have the "guts" to do so; in addition, many team members and students said that they ask more questions than before. Also, after the classes they were able to read the bill of materials and point out errors. Others also pointed to increased communication of problems or errors, increased adaptability, and improved job performance. Other evidence of progress has been that participants no longer use interpreters, they communicate with each other, write notes to the second shift, and check documents before starting a new job. Also, there have been changes in terms of confidence to communicate. They felt that they had many examples of individual/anecdotal successes and perceptions of improvement, but "no clear way to measure accurately", no concrete effects to the business' bottom line; in other words, they believe that data must be quantifiable to have value.

Additional Goals

To continue on as they have been, but to get clearer evidence of goal attainment. One person felt that the team needed more direction and research from CEI regarding recording results of the program.

Fire Control, Inc.

Strengths (Likes) and Weaknesses (Dislikes)

The EIT is a great strength of this program because those on the team (except for one) all work directly with program participants. They are very organized, which demonstrates their commitment to participating in the process. The team implemented two components which are also strengths of the program: tutoring/mentoring, and pre/post surveys.

The tutoring piece provides students with someone to go to if they have questions or want to practice something. The problem with the tutoring program is that students are uncomfortable going to see their tutor because they feel like they are bothering them; also, sometimes, by the time they manage to track the tutor down, their break is over. The team would also like to see managers and engineers become tutors (rather than just team members). The concept of the tutor is good because it provides a way for students to practice outside of class; to ensure that students are comfortable with it, it may need to be formalized more in terms of time.

Team members across the board were very positive about the results of the program. Students also were positive. They would only have preferred greater strictness on the part of the teacher.

Goals Achievement

The team identified several goals for the program. These included:
raising the English comprehension and speaking levels of workers
increasing workers' understanding of what they are building
improving efficiency
improving comprehension of visual aids and documentation
decreasing workers' fears of asking
moving workers forward so they become a resource of the company (not just people who use resources)
improving the quality of their products

All members in the focus group agreed that they had achieved more than they had expected because they had understood it would be a long-term process; now they are more aware of what a program like this can accomplish. Students also felt that they had improved their skills, and have an opportunity to use those skills, but also that they forget a lot when no longer in classes. The team has achieved clarity on the help their workers need. They find that those workers who have participated in classes speak now more than before. They ask more questions and the questions are of a different kind, demonstrating critical thinking. They got over a certain level of shyness (a barrier was broken); participants feel more like a part of the organization, and they have become more comfortable with the program itself. Also, the team has documented improvements (through statistical analysis) in quality of work as a result of program participation. This latter achievement is a key one because it is lacking in most programs. It demonstrates forethought in terms of what and how to collect data; other programs would benefit from hearing what FCI did from the beginning (when they did not yet know that they would have a lab-type setting). I highly recommend that you document and disseminate this information in a journal article.

Additional Goals

The EIT expressed an interest in meeting with other companies who have programs, to share ideas. They also expressed an interest in further tailoring the program to their own terms and processes after funding is over (and not worry about the difference between education and training). An additional goal is to improve the tutoring component.

SECTION 4: TEACHERS' PERSPECTIVES

ADP Program

Overall, ADP teachers were positive about the program. In particular, they feel that Kathy Hassey is doing a very good job; specific comments were that she provided structure to staff meetings, that she is working hard on curriculum and assessment issues, and that she goes the extra mile. Areas of concern primarily revolve around perceived lack of clarity in communication.

Strengths of the program include

- demands made of students are rigorous
- students are motivated and eager
- the mission of having students get their diploma; the vision of helping educationally disadvantaged people
- staff meetings which were helpful in sharpening the focus on key issues, especially that of what students need to do in order to graduate legitimately/extent of contact between/among teachers was sufficient
- organization of program in three strands
- extent of class time
- individualized attention students receive because of small class sizes (note that some teachers felt classes were too big: agreement was that 10 was an optimal number)
- supportive atmosphere (in supporting students)
- commitment of teachers
- academic (rather than experiential) approach of program (noted as a strength by one instructor)

Weaknesses/areas for improvement

- responsibilities of instructors are vague: counseling seems to be part of the job description, but it is not clearly defined (seems to include tutoring, phone calls, meetings). A lot is asked of teachers; as a result, committed teachers put in extra time for which they are not paid.
- curriculum is vague (but note that this is partly due to the high turnover recently in the Coordinator position, and work is now being done in this area, which staff recognized): there needs to be a concerted effort to draw up and establish an integrated curriculum, to develop or find materials suited to this population (especially reading materials); it is a problem that there are limited materials which are appropriate to this population

- methods/approach to use in assessing students has been vague; skills necessary for receiving the diploma, considering that they have such little time and many students cannot write at all (system and criteria were changed in the middle of a year, which was disconcerting to students) (note that some teachers indicated that clarity was needed on what students need to do in order to graduate legitimately, while others felt that clarity had been reached) - it may help to develop benchmarks
- suddenness of communications has been problematic (see above example)
- a written mission statement or statement of purpose would be appreciated
- communication needs to be improved (and written): mission, grading system, expectations for graduation, curriculum
- visitors to classes were found to be an interruption, particularly when there was little or no warning; it was felt that visitors should be observers but not participants because the time is so limited and the amount they need to cover is so great
- goals and objectives need to be more clearly defined; there was felt to be a lack of consistency

Teachers' understandings of program goals

- to bring students to the point where they can graduate from high school/get a high school diploma
- (given this goal, teachers need a clear understanding of what is expected of students for them to be able to do this)
- to enhance people's personal development and the company's pay-off in productivity (hence a customized curriculum; the greatest connection between getting the diploma and personal development was improved verbal and written communication)
- to make employees more confident and self-assured so they function better in the workplace and in society

Given the focus on a high school diploma, the teachers did not see any importance to being in a workplace environment; the environment and the funding source had no affect on their teaching.

Evidence of goal attainment

- progress in verbal communication and confidence to present to others (confidence means willingness to speak, to not be quiet or timid, to stand up in front of a group and talk; this was evident in the presentations at Boston Scientific)

- students get their diplomas (but no knowledge of long-term effects)
- use of exams, reports, essays, and presentations: measured against the quality of their work in these areas at the start of the class

ESL Program

Strengths of the program

- flexibility of program to respond to needs of a particular class
- staff meetings; extent of contact with other teachers (teachers meetings were run well in that Katherine helped them listen to each other and reflect on their work); good exchange and sharing of ideas
- fact that Katherine took care of issues with management so that teachers were free to just teach (note that there was disagreement on whether this was a strength or a weakness)
- tutoring program at Fire Controls
- Teams: a strength because was very active (but also a weakness - see below)

Weaknesses/areas for improvement

- a curriculum guide is needed
- a written list of objectives (both this and the curriculum guide would help give the teacher direction)
- the fact that the instructor is not involved in the team was seen by one teacher as a weakness because she felt that there was a communication breakdown in the dispersal of information (people hear differently and report selectively, so when one does not get the information first hand, one may be missing something of importance); also, since this teacher has a lot of experience with a team-based approach, she felt that she could have provided valuable input
- classroom space (such as a conference room rather than the cafeteria)
- materials: an on-site "library" for students; materials which apply skills in more ways (moving students to apply skills beyond the classroom)
- most teachers on the ESL staff come from backgrounds in reading and learning disabilities (two very important areas) and with children. They do more reading/writing/phonics activities with ESL books and less work on speaking/listening/conversation. For some teachers, the transition from children to adults and from school environment to workplace environment has been a difficult one (but Katherine has done a good job of orienting people to teaching in this environment)
- it may help to develop benchmarks or some other "standard" way to indicate student progress so it is clear on forms what the marks mean

Teachers' understandings of program goals

- to get each student functioning at work on a higher level
- to get them ready for further training
- to make them greater assets to the company
- to communicate more/better with each other and with management (ask/answer questions, read procedures)
- to improve critical thinking skills

Evidence of goal attainment

- students speaking more in class, asking more questions (or different kinds/order of questions)
- students articulating their needs more
- students participating in/contributing to discussions
- students organizing ideas in writing
- students mastering use of grammatical structures
- students improving reading comprehension (reading more difficult texts)
- increased confidence: less hesitancy in speaking, more eye contact, greater willingness to talk

For the ESL teachers, the funding source and the workplace environment have affected their teaching. They find the focus to be more narrow, with company needs having priority; however, they also articulated their own, broader goals. One teacher pointed out that the focus is on English as a vehicle for communication rather than as isolated, abstract, and academic. Examples of how classwork relates to the workplace are: pronunciation activities to improve students' comprehension of others and others' comprehension of the students; reading skills such as previewing, scanning, finding main ideas and verifying details (relates to reading work orders); asking and answering short questions (to address supervisors' complaints that students do not ask when they do not understand and do not respond to direct questions); job titles and job duties. On the other hand, another teacher focused her comments on "academic" skills, such as reading grade levels. Increase in grade level was her primary indicator of progress and success.

CONCLUSION

The purpose of this report is to help CEI improve its workplace education services to organizations. This involved determining what went well in the last two years of Global 2000 and what could be improved. The data collected demonstrate that the classes which CEI provides are strong. There is a partnership at each site among key stakeholders, although there is variation from site to site regarding the extent to which all stakeholders contribute to goals and activities. All sites have a plan and goals statement; at this point, these plans should be reviewed. I recommend revising if necessary to make the goal and indicators clearer and easily measurable. In addition, as indicated in Section 3, data collection instruments may need to be revised. However, as also indicated in Section 3, there is evidence of results at all sites, both with regard to impact on students and with regard to impact on the workplace. The greatest weakness of Global 2000 is in collecting and analyzing data, but if revisions are made as recommended throughout this report, this may be improved. Since one site has done a great job of collecting data (Fire Controls), they may be used as a model for other sites.

The task of determining goal achievement depends on having clearly articulated and measurable goals. It also means developing procedures, such as regular focus groups, for collecting anecdotal information. Refer to the attachments for sample forms and procedures which may help when revisiting this process with the Employee Involvement Teams. A highly useful reference is Lynch (1996) Language Program Evaluation: theory and practice. Melbourne: Cambridge University Press. Also refer to the next issue of Adventures in Assessment, put out by World Education.

EIT FOCUS GROUP - DRAFT PROTOCOL

Introduction

CEI has asked me to come in and speak with you to help them determine in what ways the workplace education program have been successful so far, and in what ways their services and the program can be improved for next year. Besides meeting with you (the EIT), I will be meeting with some former participants and with some teachers. Everything you say will be kept confidential. I will only be reporting aggregate information/results. I appreciate your openness in speaking with me.

(at end: Thank you for your time)

General Information about the Team

- How often do you meet? For how long each time?
- Who facilitates the meetings? Is there a standard format? (what is a typical meeting like?)
- What are the responsibilities of the team? What does the team do? (get specifics of what happens in a meetings and outside) Why?
- Do you think a team is an effective governing body for the workplace education program? (explain how, why)
- What challenges do you face in doing these tasks? (explain)
- What would help make the team more effective in carrying out its responsibilities?
- Are there other tasks you think the team could/should be involved in, but hasn't? What and why?
  Is the EIT what you expected? How?
- How would you describe the relationship between CEI and the company?

Information on the Program

- What are the program's philosophy and goals, to the extent articulated? How do these relate to the company's philosophy and goals?
- What did you like/dislike about the last two years?
- Did the program meet your expectations? How, how not?
- Now that you've experienced the program for two years, have your expectations changed? How?
- What do you see as the strengths of the program?
- Are there any ways you think the program could be improved?
- What does 'success' mean to you? What counts as 'evidence' of success?
- What changes do you look for to see whether students are 'succeeding' or making progress in their English language skills? What kind of data do you collect?
- How does the program connect with other training and development/ organizational change initiatives?
- By the end of year 3, what would you like to see happen/change?
- The company has the following goals for Global 2000 (remind them of goals and measures)
  - What is the relationship between the ESL program and these goals?
  - How does the ESL program help the company achieve these goals? (specific examples) How do you know?
- Are there opportunities for workers to apply new skills gained through the program at work? (examples)
- What evidence is there, if any, of results of worker participation in the education program on:

  The workers themselves (e.g. changes in job status, performance, understanding of co. information, etc.)?

  The workplace (e.g. quality of goods, etc.)?

PARTICIPANT FOCUS GROUP - PROTOCOL

Information on the Program

- What classes did you take? When?
- What did you like/dislike about the last two years?
- What would you like to be different next year?
- What would you like to be the same?
- What are/were your goals?
- Did the program meet your expectations? How, how not?
- What do you see as the strengths of the program?
- Are there any ways you think the program could be improved?
- How do you know if you are learning or making progress?
- Do you receive other training?
- Are there opportunities for you to apply new skills gained through the program at work? (examples of when you are given or not given opportunities)
- Does anyone monitor if and to what extent you apply new skills you learn in class at work? If yes, who and how?

- Do you see any results/changes of participation in the program:
  On how you and/or others do your work or understand your role in the company?
  On yourself personally,in your family, and/or community?
- Do you think there are other workers here who could benefit from classes but don't come? Why do you think they don't come (barriers to participation)? Is there a way we could help encourage them?
- These are the company's goals for the program (tell them).
  Did you know these were their goals?
  Does the program/classes help achieve these goals? How, how not?

TEACHER PROTOCOL

1. What are your responsibilities with CEI?
2. How long have you been at this site? What do you teach?
3. Are there other teachers at your site?
4. How much contact do you have with other teachers? Do you find this to be sufficient?
5. Is the funding source (NWLP) or the fact that this is a workplace program important to you and to what/how you teach (i.e., does it make a difference)? In what ways?
6. As you understand it, what are the program's philosophy and goals?
7. What do you see as the strengths of the program?
8. Are there ways in which you think it could be improved? explain
9. What counts as evidence of progress to you? What changes do you look for to see whether students are making progress? (how do you note progress?)

APPENDIX B: DESCRIPTION OF THE EVALUATION PROCESS

I. Background

Over the course of eighteen months team members received a variety of instruction, support and technical assistance from the evaluation facilitators both on site and in state-wide meetings. There were four evaluation facilitators who worked with the local teams. The facilitators were: Bob Bozarjian, who was the Coordinator of the MWEI, NWLP Wave IV Program; Johan Uvin, who was the Assistant Coordinator; Kathe Kirkman, who was the Evaluation Specialist in the Adult and Community Learning Services Cluster; and Laura Sperazi, Director of Evaluation Research who was also the external evaluator. The facilitators took the teams through a twelve stage process which is summarized below. For a more complete description of the team evaluation process, refer to "Team Evaluation: A Guide for Workplace Education Programs" which is available through the ERIC Clearinghouse and from Paul Jurmo, Literacy Partnerships. (See "References and Resources" for more information.)

II. Twelve Steps of Team Evaluation

Step 1: **The team is convened and introduced to the principles of team evaluation.** The team meets for the first time, reviews relevant materials on team evaluation, and considers the challenges and benefits of working together on an evaluation project.

Step 2: **The team clarifies its expectations regarding evaluation.** The team builds the foundation for its evaluation activities by answering the basic evaluation question: Who wants what information for what purpose? Differences in stakeholder

expectations are clarified. Differences between summative and formative evaluation questions are also clarified.

Step 3: The team identifies the goals it wants to evaluate. Summative or outcome evaluation: the team identifies program goals with special attention to if/how goals differ across stakeholder groups, and chooses the goals it wants to evaluate.

Step 4: The team identifies appropriate indicators for its goals. The team answers the question "How will we know if we have met our goals?" by specifying the indicators (or "signs of success") for its goals. These indicators become the building blocks of the surveys, interviews, focus groups, and other information gathering procedures which the team will use to gather summative information.

Step 5: The team clarifies which program components need to be in place in order to achieve the desired goals, and evaluates whether the program is operating according to its own standards of quality. Formative or process evaluation: the team evaluates how the program is conducted. It establishes "quality standards" for each program component, determines if current operations meet the standards needed to achieve its desired goals, and -- if not -- develops an action plan to bring those operations into "quality range." The team thus develops an action plan to improve program operations so that the likelihood of achieving desired goals is enhanced. Teams will revisit goals, indicators, needed program components, and action plans as needed.

Step 6: The team formulates an evaluation plan. The team considers key issues in evaluation design and then thinks through when, how, and from whom it will collect the summative (outcome) information it wants -- as well as any additional formative (process) information it wants which the previous exercise did not capture.

Step 7: **The team designs and pilots instruments and procedures for collecting the desired information.** The team chooses and/or designs data-gathering procedures. The team pilots these procedures as a basic check for reliability and validity.

Step 8: **The team implements its evaluation plan.** After designing and piloting its data gathering procedures, the team carries out its evaluation plan. This includes inviting potential respondents to participate in the evaluation, creating the appropriate conditions for collecting information, scheduling the data collection, etc.

Step 9: **The team gathers and organizes its data.** Designated team members gather and organize the data.

Step 10: **The team analyzes its data**. Team members analyze the data.

Step 11: **Team members prepare a strategy for reporting their findings.** Team members consider the range of options for reporting significant findings and target their evaluation audiences.

Step 12: **Team members report their findings to targeted audiences and incorporate their findings and audience feedback into program planning and future evaluation strategies.** The team reports its findings and uses what it learns in two ways: to inform strategic planning decisions and to clarify the next evaluation questions which it will answer.

GOALS
OF GLOBAL 2000

	Pow. Gen.	Analog Dev.	AEC	Fire Control	Boston Sci.
Improve productivity of workplace	data needed?	data needed?		data needed?	data needed?
Empower participants: 1)to advance in jobs 2)to improve job performance 3)to retain jobs	data needed?	data needed?		data needed?	data nneded?
Demonstrate a model for successful workplace literacy programs in the manufacturing sector, through formation of integrated partnership	partnership exists	partnership exists		partnership exists	partnership exists

MEASURABLE OBJECTIVES AND INDICATORS
OF GLOBAL 2000

OBJECTIVES	INDICATORS	SITE
Form an EIT		
Conduct a lit/skills audit of literacy, lang., math reqs of 22 types of jobs		
Conduct needs analysis with sup. staff and employees to establish contextualized workplace specific curr. needs to determine means, measures for evaluating needs		
Conduct orientations		
recruit min. 647 participants over 3 yrs		
Conduct pre-math, rdg assessments		
Conduct ind. interviews w/647		
Provide EWL instruction for 216		
Provide math instruction for 196		
Provide rdg comp and writing for 196		
achieve participant completion rate of 80% per 10-wk cycle		

Achieve noticable improvement b/t pre and post writing samples		
Achieve 50% increase in math scores for 80% of participants		
Achieve 1 grade level increase for 80% of participants on rdg test		
Conduct quantitative and qualitative evals of project - done by EIT		
Provide ADP to 54		
Prcvide computer aided instruction and tutoring to supplement other instruction		
record and monitor improvements in 1)productivity 2)participant job performance 3)job retention and advancement		

COMPLETE LIST OF PROGRAM GOALS

1.

2.

3.

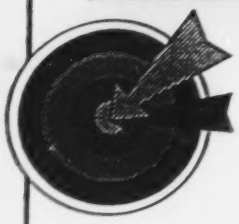
4.

5.

PRIORITIZING PROGRAM GOALS FOR EVALUATION

PROGRAM GOALS	A. Is this area already being evaluated? *0 = Yes* *1 = Somewhat, not what it could be* *2 = No*	B. Would information on the effectiveness of this goal be helpful for program or policy decisions? *0 = No* *1 = Possibly* *2 = Yes*	C. Is there any doubt or question that this goal is operating successfully? *0 = No Doubt* *1 = Some Doubt or Question* *2 = Strong Doubt or Question*	D. Is there an external request for evaluation information on this goal? *0 = No* *1 = Could be* *2 = Yes*	RATING TOTAL
1.					
2.					
3.					
4.					
5.					
6.					

280



Identify Indicators

1. How will we know whether this goal has been achieved or not?
2. What will we take as evidence?
3. What behaviors, attitudes, or events will show it's achievement?

GOAL: (Write in)
INDICATORS
1.
2.
3.
4.
5.
6.

Draft Guidelines for Curriculum Documents 8/10/95

Curriculum Working Group
Massachusetts Workplace Education Consortium

For each curriculum document, please include:

- Statement of your teaching philosophy/approach

- Description of your teaching context (workplace, class level, size, ESL or ABE, etc.)

- Description of your curriculum development process:
  - Explain how you have elicited and incorporated student input and needs
  - Explain how you have elicited and incorporated input and needs of other stakeholders
  - Explain how you elicited and incorporated workplace topics and materials
  - Explain methods you used to assess student progress, effectiveness of teaching, etc.

- Description of the challenges you learned from, what you would do differently

- Sample "chunk" of your teaching activities. Describe/include the following:
  - How the topic was chosen
  - Teaching/class goals
  - List of skills addressed
  - Time frame
  - Processes and activities used
  - Materials used (please attach)
  - Assessment tools used, if any (please attach)
  - Examples of homework, if any (please attach)
  - Reflections on the lesson

- List of topics covered in your cycle

- Resource list of published materials (texts, photos, etc.) you found helpful/have used

The Curriculum Working Group is made up of teacher representatives from each of the seven Consortium partnerships around the state.

GLOBAL 2000 PROJECT EVALUATION:

SUMMARY OF FINDINGS

Prepared by Ron Maribett and Marilyn Kobus
Maribett Management Group

for
Continuing Education Institute

July 1997

GLOBAL 2000 PROJECT EVALUATION: SUMMARY OF FINDINGS

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Introduction

The National Workplace Literacy Program, funded by the U.S. Department of Education, was designed to create opportunities for companies to experiment with innovative workplace literacy education programs. The results of these programs are to be used to establish critical success factors for implementing similar education programs longterm.

As part of this national effort, the Continuing Education Institute (CEI) of Watertown, Massachusetts, has provided workplace education via the Global 2000 project, a three-year program geared to improving literacy in five Massachusetts manufacturing companies. To date, over 330 employees/students have participated, and are expected to complete the program. Half of the students' training was offered during work hours, and the other half was on the students' own time.

This report describes the findings generated from a project whose purpose was to evaluate the effectiveness of Global 2000, and establish its business results and value. External evaluators from the Maribett Management Group were contracted to analyze the relationship between the knowledge students gained in the classroom, their actual performance on the job, and the resulting business impact of their new performance. In addition, evaluators identified ways in which the program could be improved in order to maximize its business value in the future.

This report covers the following areas:

- *Specific applications of learning on the job*: A description of how selected skills and concepts taught in the Global 2000 program have been used in action on the job by a sample of participants

- *Business impact of learning on the job*: The resulting consequences of applying the learning, including measurement of the bottom line business impact, as appropriate

- *Barriers to learning and its implementation*: The identification of previously hidden, deeply rooted bottlenecks to learning and/or using what was learned in one's day-to-day work

- *Improvement opportunities*: Recommended program improvements, designed jointly by students and researchers, to address barriers and to maximize the bottom line impact of the program.

Project Outcomes

An innovative approach to program evaluation, called Field Action Testing ™, with its use of distinctive inquiry tools, allowed researchers to produce unique breadth, depth, and precision in their results. Through the analysis of "internal dialogues" (that is, typically uncommunicated thoughts and feelings that are sometimes

difficult to discuss or even undiscussable), researchers were able to tie the learning from the program directly to specific actions and consequences on the job.

Students themselves reported that they received substantial value from participating in the research as well. Specifically, their participation produced important information for them with regard to their interpretations of various situations, and how to make the most, in their daily actions at work, of the material learned in class. (See Appendix A for more information on the research methodology.)

All students interviewed mentioned pronunciation, grammar, comprehension, reading and writing as key areas in which they felt they had improved significantly through their participation in the Global 2000 program. These students applied their most significant learnings in several different ways on the job, which generated business results in the following areas:

- More effective verbal communication
- Greater efficiency
- Willingness to contribute ideas
- Greater capacity for expanded job responsibilities
- Lower error rates

Furthermore, six of seven students expressed gratitude for the opportunity to receive literacy education in their workplace, amidst personal constraints that previously prohibited them from continuing their education. Four of them mentioned benefits gained in daily life as well, (e.g., visiting doctors, lawyers, and other business offices, filling out applications or paperwork, helping children with schoolwork, and writing them notes in English). One student said he'd like to continue learning English if it were offered even on his own time completely.

Business Impact of Global 2000

The following illustrations of key learning applications and their resulting business consequences demonstrate the dramatic impact of creating a learning culture on our nation's assembly lines and production sites. Our findings show that the increased capacity to take linguistic risks invigorates the workplace with a new and profound level of productivity.

More effective verbal communication

Learning to communicate verbally produced a wide range of results, including spending less time per interaction with customers, supervisors, and co-workers, and feeling more confidence with self-expression. One student described how her new skills with the English language prompted her to speak more easily and readily at work:

"...Before like afraid when I speak English because I saw myself, I don't know much English. I open my mouth, I can speak wrong, not correct about the grammar and

the proper pronunciation. But after ... I attend ESL, I feel more comfortable when I speak English. When I think, when I talk, when I have the problem, I can speak out... Like before, sometimes I have problems, but I'm afraid to ask... or something that somebody do that is not right to me, I am afraid to answer back... Some workers they say ' This lady, she nice. She good work. But she quiet. She doesn't talk,' because I am afraid to open my mouth, I not speak right. But now I am not afraid anymore."

This impression was supported by Lois J. Thoms, Manager of Human Resources for Fire Control Instruments, Inc. in her testimony before the U.S. Senate, Labor and Human Resources Committee on May 16, 1997, when she stated, *"We no longer need to use interpreters in our meetings or our day-to-day conversations at work. The employees now speak up and ask questions, explain their problems more clearly, and seek clarification whenever they need."*

Another student described the impact of improved self-confidence and skill with verbal expression gained from the Global 2000 program as follows: "I work with a machine, like a welding machine that was computer... You might think something was wrong [on the machine], I mean you want to change it. Right now, I'm not afraid to speak up. I can turn the question different way. I can talk the words in different way. Explain even if my English not good, I explain the engineer or whatever, my facilitator, what I mean to say... When I started in the beginning, even if I had something to say, but I don't say, because I probably say wrong."

In one instance, this enhanced ability to communicate verbally generated conservatively over $875. per year. On a typical day before Global 2000, a student needed to discuss ECO's (engineering change orders) with a supervisor twice a day. Each interaction typically took 15 minutes, conservatively estimated. After the program, only 5 minutes per day was spent on this kind of interaction. The cost savings was calculated based on an $8.87 hourly wage, and includes neither the cost of benefits nor the supervisor's time. (See Appendix B for a detailed illustration of how costing figures were calculated during this research.)

Other similar instances of time savings due to improved verbal communication between students and their co-workers and supervisors are listed briefly in Appendix C.

Greater efficiency

In addition to more effective interactions due to improved communication skills, another direct business impact deals with the increased level of efficiency generated in the workplace. As Lloyd David, Ed.D., President and Executive Director of the Continuing Education Institute, noted in his statement to the Senate, Labor and Human Resources Committee on May 16, 1997:

"In the past when [the student's] machine broke down, she used to wait for her supervisor to determine and fix the problem. Getting the attention of a busy supervisor could take quite some time. With newly acquired English skills, [the student] has gained self-confidence and now no longer waits. When she has a

problem, she goes directly to the person in the engineering department who can tell her how to fix it."

This is further verified in the following quote from a student: "...Took a lot of time because the supervisor do something very important and then she had to stop, come in on my table...If she has something to do -- I have to wait until -- because I cannot talk to, how to express myself... Now, I can call the technician or just somebody, anybody, instead of waiting, wasting her time or wasting my time. Now I can say right there, this is wrong."

In particular, one student's ability to spell and therefore read reduced her need to request the help of a technician to understand written procedures. She said: "[Knowing spelling is helpful]...especially because over here, you say words and it doesn't sound like all the letters are in the word. In my country it is different. You write everything you say...[Spelling is valuable] when I read a procedure, especially, sometimes there are new words there. If I read I understand better than if somebody tells me."

This learning generated a cost savings of $7.50/month, based on an hourly wage of $13./hour, without benefits, and not including the technician's time to provide the assistance. Before Global 2000, she called a technician over 3 times/month, for 15 minutes each time. Now, she only needs a technician's help once a month for 10 minutes. A similar application for another student generated $285.00 month (10 requests per day down to 1 request per day, lasting 10 minutes each, at $9.50/hour). (See Appendix C.)

Another student said that before the program, someone typically came three times to help her figure out instructions for a particular job on a machine. After the Global 2000 program, "I go to a different job with different instructions. I look at the job. I take a little bit of time and I figure it out by myself."

Willingness to contribute ideas

A compelling finding from this research involves the self-assessments and decisions which reside within the "internal dialogue" that drive one's willingness to share ideas, concerns, or questions. Learnings from Global 2000 (pronunciation and verbal communication, specifically) shifted these inner conversations and enabled students to share ideas more freely.

One student in particular had powerful private conversations that led to his withholding his thoughts and ideas: "...because I don't know how to say it. [I might be able to] start it, and then I have to finish it right. Or I probably stutter or say something no make sense or not explain exactly what I 'm trying to, what I'm thinking. If I think I'm gonna make a mistake on how to say right, I prefer not to say it... I want to say something right, the best I can. I don't want to call and then get stuck in the middle of the conversation." He noted that this happened ***50%*** of the time.

He reported great value from his Global 2000 teacher who helped him pronounce English sounds and words: "She make you do with the right expression...show you how to open your mouth or how the tongue... the way the tongue moving inside, the way the mouth shape, that is come out the right way to say the sound... so people understand what I trying to say... She stop and then try to help you say the word and say the letter, how you say the letter, which ones you have to say aloud, which ones you say inside..."

After the program, he reports that he is more likely to make contributions in the workplace. One idea he shared with his team, given his new willingness to speak in English, generated $7000./year in cost savings due to eliminating a step in the production process, saving 2-3 minutes per "leg" of the manufactured item: "That was a big improvement, with the money, with the time... we eliminated the ground, we go right to buffing." The student's idea also won a prestigious innovation award for his team. The innovation suggested by the student had been *overlooked by others for five or six years* until he brought it up.

Another illustration of the value of learning the language is this: One student created a device to improve the manufacturing process, but he couldn't explain why he did it. Supervisors and others attributed negative things about him, such as he's not following procedure or doing the right thing. Because of this, he stopped using the device for a while "because they were mad at me, or maybe I do something wrong...but after this, I said to myself 'Why do you stop?'. First of all, this can make for myself more easy...so I not spend for this (part of the process) too much energy, and I can do better quality, and I don't spend for this too much time by the way. And I try to improve what I want to show for people."

"So what do I do? I look up in the dictionary... I find a special word, I started to make a sentence, and then explain everything for them what I do." He also drew blueprints to use in explaining his actions.

Over the course of *one year's* frequent team meetings, this student tried repeatedly to explain himself and his device. With his improved ability to communicate and his increasing confidence in sharing his idea, "now everybody uses this and it brings for the company a lot of sense and a lot of money and a lot of quality." The result was a higher quality product that was produced more quickly (5 in a day versus 1 1/2 per day). He no longer has to work as hard at expressing himself: "Now I immediately give my idea for people, and they understand me better than I can give them before."

Other illustrations of students who are more willing to contribute ideas are in Appendix C.

Greater capacity for expanded job responsibilities

A significant outcome of improved language comprehension was demonstrated by one student's ability to take on special new projects. Before Global 2000, she performed only the basic requirements of her job. Since then, she has gained the capacity to take on 3-4 special projects per week on average, up from zero. For

example, in the domain of inventory control, without the ability to understand different terms and concepts related to a component's status in the production process, she was unable to take a physical inventory properly, which was key to the business.

Her improved understanding now allows the manager greater flexibility in managing resources and more opportunities to test out different ways of operating in the business (e.g., moving away from a segregated stockroom). Her supervisor conservatively estimates that her capacity for understanding generates at least $6000. of business value per year, based on the notion that she now can do at least 30% of the work of another person who does not need to be hired at $20K/year.

Another student reported that, before her involvement with Global 2000, she was temporarily transferred to a different department in which only English was spoken. She felt "afraid if anything happened... I don't feel that I'm going to stay by myself here alone...But they sent a letter to my supervisor that I did such a good job (that they wanted to hire me.) But I didn't want the job." After her language improved through the program, she reported that she would be willing to take on a new job in an English-speaking environment.

Lower error rates

Students who are more willing to ask for clarification or able to read more accurately have produced lower rates of error in their work. For example, one student before the program typically would say she understood even if she understood the message only partially. Now, she feels more comfortable asking her supervisor to repeat instructions more than once. On one typical occasion before Gobal 2000, she brought a problem to her supervisor, misunderstood the solution, and acted accordingly, unknowingly in error and placed the wrong parts on a board. The error was caught down the production line and the board needed rework.

This student estimated conservatively that her errors were reduced from 6 to 2 per month. Her new skills resulted in less time for rework per month (30 minutes down to 10 minutes). Even more importantly, four fewer errors per month led to a cost savings ranging from under $4.00 up to $120./month for new components, depending on the part.

Another student shared the private thoughts she had when asking for help before the program: "I feel embarrassed because I had to call them for every step I needed, most of it. Now even if I need it, I'm more sure of what I need to look for, so I'm not as embarrassed. I was sort of more afraid than not. Now I feel more confidence to talk to them... I used to worry that they'd say, 'You're so stupid. You don't know?'. But now, ...if I go look for help, that means I want to know what's going on."

Current best teaching practices

Several teaching practices emerged from the research that students felt fostered their learning. Many of the following items were identified by two or more students

as being helpful. Teachers in the Global 2000 program were viewed as effective when they were able to:

- Solicit input from the group with regard to their choice of material to learn, such as sentence building, vocabulary, work-related vocabulary, etc.
- Understand and value the differences in the class, and choose exercises that were relevant for them
- Create a group feeling amongst class members where it was safe to make mistakes
- Check in with the group on a regular basis with regard to pacing, level of material, and full understanding
- Help students with correct pronunciation whenever possible during conversation
- Use partners and small group exercises (e.g., for practice in conversation, reviewing homework, and responding to structured questions on readings)
- Create assignments that involved reading books, newspapers, articles, etc. and then producing a written summary, noting new vocabulary
- Create assignments that involved the group bringing in their own vocabulary words, perhaps from the job, spelling them properly, and then defining them, and using them in sentences
- Give plenty of opportunity to have conversations in order to practice.

Two insightful examples of the fruits of quality teacher sensitivity are described below:

"She welcome me with the open arms. Come in to the English... during the program she's like with open arms... she had a nice attitude. It's something that nobody force you to do it, and you want to do it, you do it. And then I can't wait till tomorrow to go to that class again because she's nice, everything. Plus the class made everything so --- it was a lot of fun. And (with) that fun, I learn alot."

" I thought I would be lost [in math], it's the worst thing I could do, but the way he is teaching he's doing such a good job. He explains until it gets into your brain. And he knows when we're confused or when we understand or we don't know or understand. He says, I don't know if you're confused if you don't tell me."

Barriers to learning and its implementation

Clearly, this research generated grounded illustrations of the business value that was produced from the students applying what they learned in class to their job situation. It also identified teaching practices that students perceived to be helpful.

At the same time, much can be learned about how to maximize the value of this or any educational intervention when *previously hidden* barriers to learning in the classroom and/or its implementation are uncovered.

Some examples of hidden barriers to learning in the classroom that occurred throughout the students' internal dialogues are listed below. All of the barriers were withheld, knowingly or unknowingly, from the teachers.

- Uncertainty about one's ability to be successful during the class; dealing with an inner desire to withdraw from the program versus dealing with the difficulties and hard work

- Beliefs about the group that may or may not be accurate (e.g., the others are ahead of me and know more; the pace is just fine for the others; it's more important for them to get it [to understand this] because they need their citizenship); feeling the need to manage the problem on their own, rather than raising the concern

- Belief that differences between one's learning style and the teacher's style were irreconcilable; student's style preferences remained undiscussable, resulting in student's withdrawal from class

- Fear of speaking up in front of the class in general, without regard to language difficulties

- Perception that teacher spoke too quickly, with complicated words, and gave too much straight lecture. "(If) we understand everything, we don't need the English class."

- Perception that not enough attention was given to spelling and grammar (in the Adult Diploma Program component of Global 2000) so that the student could remember the words, improve vocabulary, and build better sentences.

Some barriers related to on-the-job implementation of the learnings are expressed in the following quotes:

"I forget the next day everything I learned, and that is very bad for me, but unfortunately it's true...it's not a young memory like young kids... If in my life here in this company I have opportunity to talk with people more often than I do, then I have opportunity more often for some instruction. It doesn't matter what... If I have time to write something, I can keep it inside my memory... you know, it's not easy to remember because I still think under my language."

"I want to say it another way. I don't have opportunity for English. I come to work... I do the same job. I'm not talking with somebody... unfortunately this job doesn't give for me this opportunity."

Improvement opportunities

Through the identification of previously hidden barriers to learning *in the classroom*, important lessons were learned about just how to provide the most effective workplace literacy education possible, given the contraints inherent in it. Teacher sensitivity, a thorough understanding of what the student is experiencing, and the need to establish a working dialogue both in and outside of the classroom surfaced throughout the interviews as successful ways to overcome barriers to learning.

These solutions were jointly designed by the researchers and the students during the interviews. They represent possible actions to take or continue taking to address the barriers and maximize the value of the Global 2000 program in the future. More specifically, teachers are likely to be more effective when they are able to make discussable some of the barriers in a safe and productive manner. For example, effective collaborative teachers:

- Check in frequently with the group during class to see how they are doing

- Put forth to the group their internal dialogues (e.g., that they have an inference that students may be experiencing nervousness, for example, or some other feelings about reading aloud, trying a new subject or difficult area, staying with the program, etc.). and check with the group for accuracy. Facilitate an open discussion and work towards designing solutions to the confirmed difficulty.

- Check with the group for clarity and full understanding before moving on.

- Encourage the group to initiate open sharing and testing of their perceptions (e.g., around pacing of material, learning style preferences, unclear concepts being presented, rate of speech, etc.) and ensure that it is done in a safe and productive manner

- Explain and use tools that produce shared meaning and understanding in human interactions in order to maximize the effectiveness of their class time.

With regard to dealing with the barriers that hindered the application of learning *on the job*, the following solutions are proposed for consideration:

- Make available more opportunities to speak with English-speaking people
- Make available more opportunities to read and write, preferably with coaching
- Assist students in finding an on-the-job mentor who can support and encourage them to continue with their efforts to learn.

During the interviews, additional suggestions were proposed to deal with students' possible reluctance to choose to even enroll in the class. Students suggested that recruiters:

- Encourage prospects to voice their objections or concerns about enrolling so that they could be addressed and advice be offered

- Address possible cultural differences around the notion of adults "going to school"
- Invite former students to come to the recruiting session to share their experiences and the value received.

Conclusion

In conclusion, the National Workplace Literacy Program made possible an effective environment for students to make valuable advancements in their literacy skills and contributions to their companies. Using the Field Action Testing™ evaluation approach, researchers were able to identify, document, and measure those specific contributions and the value added to manufacturing companies who were part of the Global 2000 education program. Clearly, this research directly linked the development of a learning culture in organizations with significant business impact.

GLOBAL 2000 PROJECT EVALUATION: SUMMARY OF FINDINGS

APPENDICES

Appendix A: Research Methodology
Appendix B: Costing Illustration
Appendix C: Highlights of Business Impact

APPENDIX A: RESEARCH METHODOLOGY

Field Action Testing (FACT)™, the unique evaluation and continuous improvement system used to evaluate the business impact of Global 2000, made use of distinctive inquiry tools as an important cornerstone of the methodology. These tools are designed to draw out specific action illustrations from the learners' actual experiences, and to tap safely and productively into areas typically not addressed by traditional research methods.

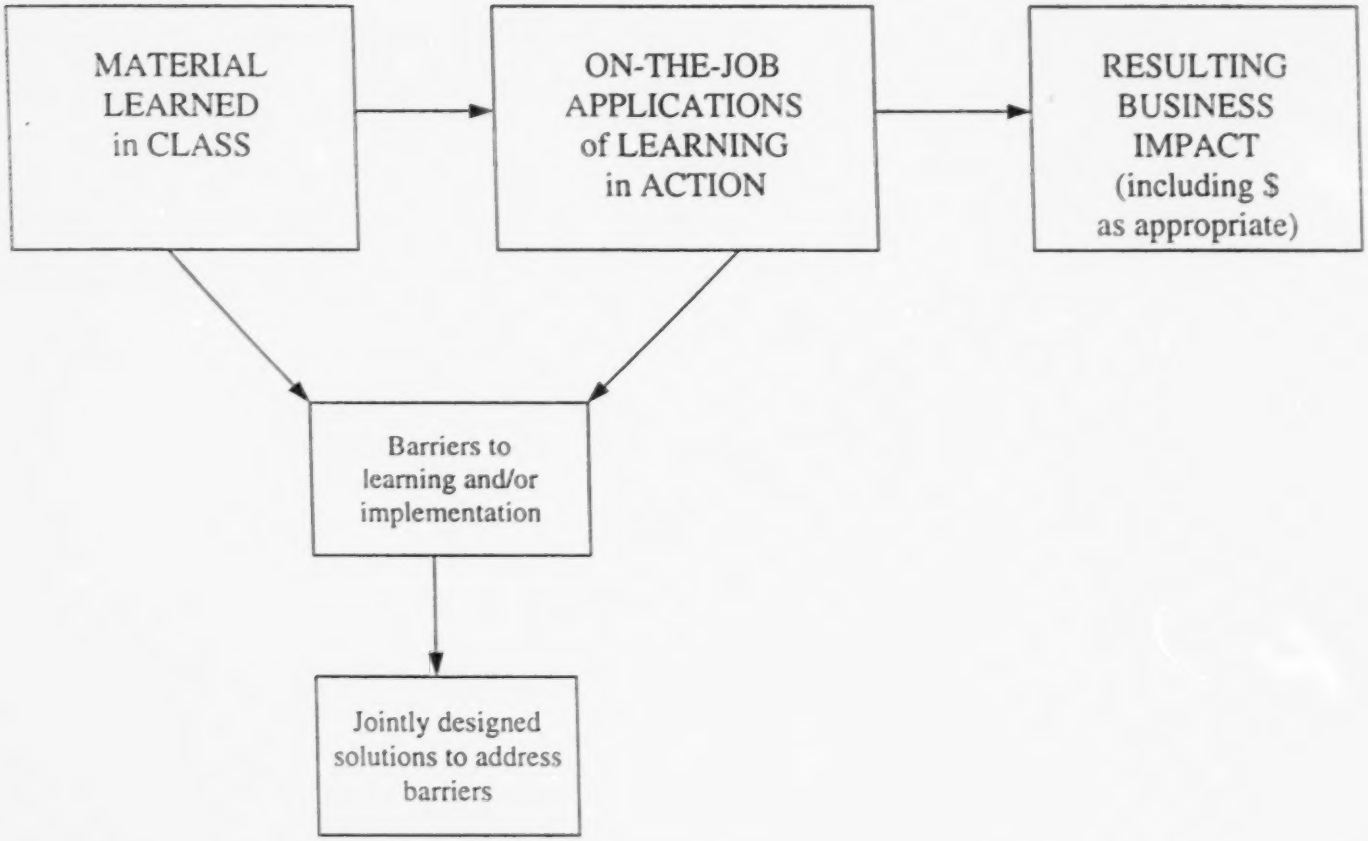
In particular, the research method incorporated students' "internal dialogues" (that is, their typically uncommunicated thoughts and feelings that are sometimes difficult to discuss or even undiscussable). By accessing internal as well as external dialogues, and capturing the thoughts and insights reflected in them, evaluators were able to produce unique breadth, depth, and precision in the results.

The 1 1/2 - 2 hour long interviews were designed to provide substantial value to students as well as to the researchers. Students reported that they learned important information regarding how they interpreted various situations, and how to make the most of the material learned in class in their daily action. Participation was totally voluntary and students were informed that their acceptance or decline of the invitation to participate in no way impacted their job performance evaluation. All invitations were accepted.

A series of seven in-depth interviews were conducted with students who had a range of experience with the program, from very positve to not so positive. This was done by a selection process designed to capture this range of experience. Once the sample was formed, the audiotaped interviews were conducted, transcriptions were made which were then analyzed by trained FACT™ practitioners. Confidentiality standards were established and agreed upon by all parties. Certain findings related to business value, however, were corroborated by appropriate supervisors and/or business managers in order to verify their validity as conservative estimates. Reporting and interpretation of findings were further validated by participating students during the reporting/feedback process.

The interviews followed a semi-structured format to establish the students' most significant learnings. Researchers used a set of tools to obtain grounded illustrations of students learning in action, and to generate precise shared meanings of those learning applications, their resulting business impact, the percieved barriers to implementing learnings, and proposed solutions to the barriers. A quality assurance check was conducted prior to the end of each interview in order to maximize the value of the researchers' own practices in future interactions. The dollar value of the impact, when relevant, was calculated after the interviews based on factors contributed by the students, due primarily to time constraints and availability of precise information.

FIELD ACTION TESTING[tm] APPLIED TO GLOBAL 2000


MATERIAL LEARNED in CLASS
ON-THE-JOB APPLICATIONS of LEARNING in ACTION
RESULTING BUSINESS IMPACT (including $ as appropriate)
Barriers to learning and/or implementation
Jointly designed solutions to address barriers

APPENDIX B: ILLUSTRATION OF COSTING

This research identified specific on-the-job actions produced by the students that were driven by the learning gained during the Global 2000 program. The consequences of these actions were also identified, including, whenever possible, their impact on the bottom line.

The following excerpt is in regard to a student who reported improvements in her reading comprehension which resulted in her needing less assistance to understand written procedures. This is a simple illustration of the way researchers accounted for that learning's contribution to the bottomline.

Student: ... Sometimes, if I don't know exactly what it is, then I call somebody... When I read the procedures, when I see words like this... that I never heard in my life. I don't know exactly what to do with that, so they [technician] come and explain what this means...

Researcher: Can you recall a specific time when that occurred? I'd like you to focus on that time in particular.

Student: OK. I have one in mind. I looked at the procedure and found something, and went over there to try to do it, and then I realized I didn't know exactly what it was, so after a while I called somebody.

Researcher: So, when the technician came over to help you, how many minutes do you think it took?

Student: Maybe fifteen or twenty minutes.

Researcher: Is that typical?

Students: It depends. Some of them like to wait and see if I really understand. Some of them just explain and leave. But fifteen or twenty minutes is typical.

Researcher: What I'm doing is I'm trying to come up with something that is reasonable and very conservative based on what change happened for you as a result of your being better able to read the procedures... Let me check then. Given what you've experienced, "conservative" would be that your requests for help took at least 15-20 minutes each time, and more likely more that than. Does that ring true for you? Are you comfortable with that as a conservative estimate, or is something less than that conservative?

Student: Oh yes. I'd say that's conservative.

Researcher: ...So let's say over a period of time, before the Global 2000 program, how many times do you estimate that you would have had to call over a technician?

Student: (Before the program) if I see something that I don't know or I don't understand, I would have to call somebody to explain every time. That's about 2 to 4 times a month.

Researcher: But now, in a month then, can you tell me, conservatively, how many times do you need to request help?

Student: Not more than once a month.

Again the researchers verifed with the student that that estimate was conservative. Offline, we gathered salary information and verified these estimates with the student's manager. Whenever a range of numbers was presented, we chose to go with the lower of the two numbers in our calculations.

The bottomline impact for this illustration of learning in action was a savings of $36./month, conservatively estimated. Before the program, the requests for help cost $46./month. After the reading gains from the program, the requests for help cost $10./month. Net savings, then, are $36./month.

Here is how the dollar value was derived:

Using the rate of $26./hour for the student (fully burdened salary plus benefits), requests per month lasting 15 minutes each cost roughly $20.00/month (45/60 times $26). Add to that the technician's time for assisting her. Using the rate of $35./hour, fully burdened, these same requests cost another $26.00/month (45/60 times $35). In sum, the requests for help before the program cost roughly $46./month, conservatively estimated.

After the program, our data shows that these requests were reduced to only once a month. Further probing showed that the length of the interaction decreased also to 10 minutes on average. The cost factor here then was reduced to roughly $10./month. (10/60 times $26 plus 10/60 times $35).

APPENDIX C: HIGHLIGHTS OF BUSINESS IMPACT

On-the-job learning application	Change (before and after program)	Calculation*	$ Value/Cost savings
More effective verbal communication			
Less prep time needed to translate into English prior to an interaction with supervisor	Before: 2-5 minutes/interaction, 3X/week After: 0 minutes/ interaction	6 minutes/week x 4 x $8.00/hour**	$3.20/month
Better able to explain problems with machine to supervisor	Before: 6 min./interaction, 3x/week After: 2 min./ interaction, 3x/week	18. min./week x 4 x $8/hour = $9.60/month 6 min./week x 4 x $8/hour = $3.20/month	$6.40/month not including supervisor's time
Better able to understand supervisor's request for an ECO (Engineering Change Order)	Before: 15-20 min./interaction, 10x/week After: 5 min./ interaction, 5x/week	150 min./week x 4 x $8.87/hour = $88.70/month 25 min./week x 4 x $8.87/hour = $14.78/month	$73.92/month not including supervisor's time
Better able to understand internal customer requests for parts	Before: 3 min./difficult interaction x 4/day = 12 min./day After: 0 difficult interactions	60 min./week x 4 x $9.60/hour	$38.40/month not including internal customers' time
Greater efficiency			
Improved vocabulary, spelling and reading led to fewer requests for help from technician in reading procedures	Before: 15 min./request x 3/month After: 10 min./request x 1/month	45 min./month x $13/hour = $9.75/month 10 min./month x $13/hour = $2.16/month	$7.59/month not including technician's time

* Whenever a range of figures was given, the lower of the two was used in calculations

** Calculations are based on hourly wages only and do not include benefits, etc.

On-the-job learning application	Change (before and after program)	Calculation*	$ Value/Cost savings
Improved reading, and verbal communication led to fewer requests for help with procedures	Before: 10 min./request x 10/day After: 10 min./request x 1/day	2000 min./month x $9.50/hour = $316.66/month 200 min./month x $9.50/hour = $31.66/month	$285/month (not including helper's time)
Less time for training on new procedures	Before: Helper had to return 3 times to assist with new procedure After: No help required		
Less need for manager to repeat or paraphrase assignments	Before: 4-5 repetitions/ assignment After: 1 repetition/ assignment		
Willingness to contribute ideas			
Shared innovative idea that eliminated a step in manufacturing process	Saved 2-3 minutes/"leg"	Reported by quality team leader	$7,000/year
Created new device to improve product quality and ease of production (fixture to hold item while buffing it)	Before: workers produced 1 1/2 items/day After: workers produced 5 items/day with higher quality and less effort		
Improved ability to explain thought process when making suggestions	Before: Just went along step-by-step with what supervisor said, regardless of efficiency and effectiveness After: No longer afraid to suggest how work could be sequenced differently		
Greater understanding of conversation in team meetings	Participates more readily		

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On-the-job learning application	Change (before and after program)	Calculation*	$ Value/Cost savings
Greater capacity for expanded job responsibilities			
Improved language comprehension led to increased ability to take on special projects, adding flexibility	Before: 0 projects/week After: 3-4/week	Reported by supervisor: 30% of another $20,000 position is now handled without new hire	$6000/year
Have more confidence in all English-speaking environment	Would accept a job opportunity in another department that was previously refused		
Lower error rate			
More comfortable asking for instructions to be repeated	Before: 6 errors/month After: 2 errors/month	6 errors x 5 mins./error = 30 min. x $8.00/hour = $4/month 2 errors x 5 mins./error = 10 min. x $8.00/hour = $1.34/month $1-$30 for replacement parts/error	$2.66/month plus $4-$120/error for parts savings (4 errors avoided)
Improved ability to read special instructions on orders	Before: Translating instructions improperly or ignoring them After: Greater accuracy	Reported by supervisor	Reduction in scrap

On-the-job learning application	Change (before and after program)	Calculation*	$ Value/Cost savings
Greater interest in and sensitivity to work environment			
Better able to understand conversations within team	Before: Understood 20% of conversations After: Understood 50-60% of new info during meetings and 80-85% of conversations related to familiar work topics		
Better able to read company communications	Greater interest in written company information, newsletters, events postings, etc.		

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